INTERNATIONAL PROJECTIONIST

MAY 1952

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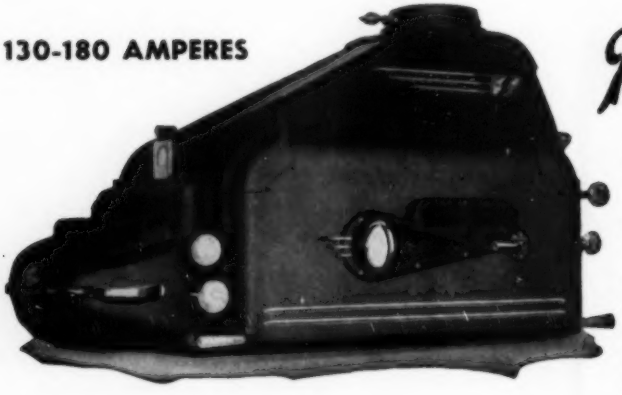

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NEW MAGNETIC STABILIZER

This modern lamp produces all the light there is. . . . It is the standard equipment of the nation's largest and finest theatres. . . . Used by 90% of the largest Drive-In Theatres.

It is the "Omega" for maximum screen brilliance. . . . Nothing can even approach it in *white* light volume when used with projectors that have efficient revolving shutters.

Assures satisfying projection for Drive-Ins regardless of the size of the picture, length of throw, and under all weather conditions. . . . They are Und. Lab., Inc. listed and, therefore, *not* insurance hazards. . . . Heat filter assures no risk of film-heat damage at maximum arc amperage and maximum screen lumens.

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INTERNATIONAL PROJECTIONIST

With Which Is Combined PROJECTION ENGINEERING

HENRY B. SELLWOOD, *Editor*

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MONTHLY CHAT

IN THESE days of basic reorganization of the industry, when theatres are closing down at a pace probably unknown since the depression, it is instructive to observe, and to check the observations of others, as to the *kind* of theatre that seems to be closing. Perhaps someplace there is some well-kept, well-run, quality theatre that has shuttered its doors—but where? No doubt in any year, under any circumstances, some few well-kept, well-run houses have found competition, or changing conditions, too difficult to meet. Yet the almost universal impression (confirmed in conversations at the recent convention at which members of the SMPTE gathered from all parts of the United States and Canada) seems to be that the "shooting gallery" is the theatre finding difficulty in surviving today, and often not surviving.

"The death of the dump" was the way one person described, in private talk at the Convention, the change that seems to be coming over the character of our industry. By contrast with the "death of the dump" the well-maintained, well-operated house seems at this moment not only to be surviving happily, but to be reporting an actual upswing in attendance and profits.

The moral for the projectionist seems to be reasonably clear—if you are working in a "dump" your job probably is not too safe; if you are turning out high quality projection and sound in a quality theatre, you probably have nothing in particular to fear so far as job safety is concerned.

The reason seems fairly clear too — TV. Why pay for third-rate entertainment? It's available at home for free, or at the corner tavern for the price of a couple of beers. The 60 or 80 or 90 cents the shooting gallery asks for third-rate entertainment is more than the same is worth—today.

To the contrary, there is no place except the theatre where anyone can find well-presented picture entertainment — clear, steady, bright, probably in full color, accompanied by stirring and dramatic sound. This the tavern cannot offer, nor the living room either. This, it appears, they still come for and pay for. The kind of theatre that offers well-presented entertainment is not the kind that is closing down.

The projectionist has in this situation two very obvious responsibilities — to himself, insofar as the continuance of his job is at stake, as well as to his employer. The first is, of course, to put on the very best show possible with the equipment provided, and (so far as permitted) to put that equipment and keep it in condition to do its best work. The second relates to the limits of the projectionist's power — he *can't* put a bright picture on a dirty screen and he does not have power to change the screen; he can't pump good sound

(*Continued on Page* 30)

Destry will ride tonight—positively

NO QUESTION, the show will go on—tonight—and every night . . . go on with all the blood-and-thunder that distinguishes the new-day Western—a stellar example of work inspired by modern technics, equipment, and materials.

Here, too, is a stellar example of the way the Eastman Kodak Company functions through the Eastman Technical Service for Motion Picture Film.

For, in addition to aiding studio and laboratory in film selection and processing, representatives collaborate with exchange and theater in helping solve problems of projection—help check film and equipment . . . make light measurements, determine proper levels . . . all to help assure good showings, black-and-white or color.

To maintain this service, the Eastman Kodak Company has branches at strategic centers . . . invites inquiry from all members of the industry. Address:

Motion Picture Film Department

EASTMAN KODAK COMPANY, ROCHESTER 4, N. Y.

East Coast Division	Midwest Division	West Coast Division
342 Madison Avenue	137 North Wabash Avenue	6706 Santa Monica Blvd.
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VOLUME XXVII MAY 1952 NUMBER 5

Standards Promote Better Projection

PROJECTION and sound are better in quality—much better—than they possibly could be if accepted standards did not exist. Standards tell the studio and manufacturer, as well as the projectionist, what physical, electrical or optical considerations each should meet, or what performance factors each should achieve, in order to produce the best projection and sound quality that can reasonably be expected in the current state of the art.

Officially accepted standards are approved by the American Standards Association (ASA) but suggested, created and submitted by the Society of Motion Picture and Television Engineers (SMPTE), or the Motion Picture Research Council, or both. All three organizations cooperate closely in procedures relating to standards.

Some accepted standards are of direct interest and importance to the projectionist. Others are important to him only indirectly. It is certainly essential to any projectionist that prints reaching his projection room adhere to accepted physical standards.

Suppose, for example, the sprocket hole spacing were non-standard and did not fit the sprockets! Such things did take place in the very earliest days of the industry when a few misguided manufacturers imagined they might benefit if no other film could run on their projectors except their own, or if no projector except theirs could show their prints—but this item of ancient history is now only indirectly of interest to the projectionist. Standardization has taken care of that detail for well over a generation. Established standards for such details as release print dimensions and perforations directly concern only manufacturers of film and equipment, not the projectionist. His concern with them is limited to the fact that they assure that prints reaching his projection room will fit his projectors; otherwise the projectionist has no further interest in standards relating to studios or factories only.

On the other hand, the "American Standard Specification for 35-Millimeter Sound Motion Picture Release Prints in 2000-Foot Lengths" is of the most positive direct interest to every projectionist. This standard describes what the film should be like when it reaches the projection room. It defines the length of head and tail leaders, the number of frames to each, the printing on each frame, the cue marks—it constitutes a complete description of what a standard 2000-foot reel of film should be and thus serves the projectionist as a practical (an unanswerable) basis of comparison against which to estimate the condition of the reels he receives.

Other standards of direct interest to the projectionist specify performance characteristics—as for example, screen brightness; still others describe equipment characteristics as in test films or in screen dimensions.

Classification of Standards

For ready identification and reference all standards, in or out of the motion picture field, are numbered according to a universal decimal classification. Most of the standards with which projectionists are concerned directly or indirectly fall into the classification Z22. This identification is followed by a subclassification and often by a date—for example, the standard for 2000-foot release prints above mentioned is classified completely as Z22.55-1947. Other projection and sound standards may be classified either under Z22, Z38, or PS22, *etc.*,—with a sub-classification and perhaps a date in each case.

Some of the standards not of strong direct interest to projectionists include, for example: Z22.36-1947, "Cutting and Perforating Dimensions for 35-Millimeter Motion Picture Positive Raw Stock," the indirect importance of which has already been stressed—or Z22.59-1947, "Photographing Aperture of 35-Millimeter Sound Motion Picture Cameras." On the other hand, "Picture Projection Aperture of 35-Millimeter Sound Motion Picture Projectors" (Z22.58-1947) comes close to the projectionist; Z22.39-1944, "Screen Brightness" provides him with a direct measure of comparison for judging the performance of his own equipment; Z22.78-1950, "American Standard Dimensions for Mounting Frames for Theatre Projection Screens" is of obvious applicability in every theatre; to mention a few.

The Standards are published—otherwise they would be of no use. Their usefulness lies in their availability for reference to all who may need them. However, the promulgating organizations, the ASA and the SMPTE (in the case of standards applying to this industry) are not profit-earning enterprises but service organizations; they do not have business-type incomes out of which they could defray the cost of distributing standards gratis. Single standards can be purchased from either of these organizations; in addition, the SMPTE has complete sets of all 66 standards pertaining to this industry for sale with or without a loose-leaf binder.

But since the object of these organizations is service and not profit, IP has been granted permission, both by ASA and by SMPTE, to reprint here, as a service to its readers, as many of these copyrighted standards as IP believes may be of interest or help to them. That series begins on the following page.

Specification for 35-mm Sound Motion Picture Release Prints in Standard 2000-Foot Lengths (Z22.55–1947)

1. Protective Head Leader

1.1 The protective leader shall be either transparent or raw stock. When the protective leader has been reduced to a length of 6 feet, it is to be restored to a length of 8 feet.

2. Identification Head Leader (Part Title)

2.1 The identification leader shall contain 24 frames as specified below:

(a) 6 frames on which are plainly printed, lengthwise with the film, in white letters on a black background: (a) reel number, (b) picture title.

(b) 18 frames on each of which are plainly printed in black letters on white background: (a) type of print, (b) reel number (Arabic numeral not less than ¼ of frame height), and (c) picture title.

3. Synchronizing Leader

3.1 The synchronizing leader shall consist of 20 frames ahead of PICTURE START mark, then 12 feet, including picture start mark, to picture. This leader shall be opaque except as specified below: In the center of the first frame there shall be printed across the picture and sound track area a white line 1/32 inch wide upon which is superimposed a diamond ⅛ inch high. In this same frame shall be printed "SOUND START," in white letters on a black background.

The next 15 frames may be used by the studio for sensitometric or other information. If not so used, this leader shall be opaque.

The picture start mark shall be the 21st frame, on which is printed "PICTURE START" (inverted) in black letters on white background. The standard camera aperture height (American Standard Z22.59-1947) of 0.631 ±0.002 inch shall be used in the photography of this frame and all others between PICTURE START mark and beginning of picture.

From picture start mark to picture, leader shall contain frame lines which do not cross sound track area. Beginning 3 feet from the first frame of picture, each foot is to be plainly marked by a transparent frame containing an inverted black numeral at least ½ frame height. Footage indicator numerals shall run consecutively from 3 to 11, inclusive. In the frames in which the numerals "6" and "9" appear, the words "six" and "nine" (also inverted) shall be placed immediately below the figure, to eliminate the possibility of misreading in the projection room due to the similarity between the inverted numerals.

At a point exactly 20 frames ahead of the center of each footage numeral frame, there shall be a diamond (white on black background) ⅛ inch high by ⅛ inch wide.

4. Picture Section

4.1 *Picture.* It is recommended that picture action start and finish on fades wherever possible, otherwise significant sound should be kept at least 5 feet from the start and finish of the picture. The length of a standard reel shall be between 1750 feet minimum (except when absolutely unavoidable) and 2000 feet maximum.

4.2 *Motor Cue.* The motor cue shall be circular opaque marks with transparent outline* printed from the negative which has had 4 consecutive frames punched with a die 0.094 inch in diameter. The center of these holes is to be halfway between the top and second sprocket holes 0.281 inch from the right-hand edge of the film with heads up and emulsion toward the observer. Following the 4 frames containing the circular opaque marks there shall be 10 feet and 12 frames to the beginning of the changeover cue.

4.3 *Changeover Cue.* The changeover cue shall consist of 4 frames containing circular opaque marks punched similarly to and of the same dimensions and position on the frame as the motor cue. Following the changeover cue marks there shall be 18 frames to beginning of runout trailer.

5. Runout Leader

5.1 The runout leader shall be opaque and 3 feet in length.

6. Identification Tail Leader (End-of-Part Title)

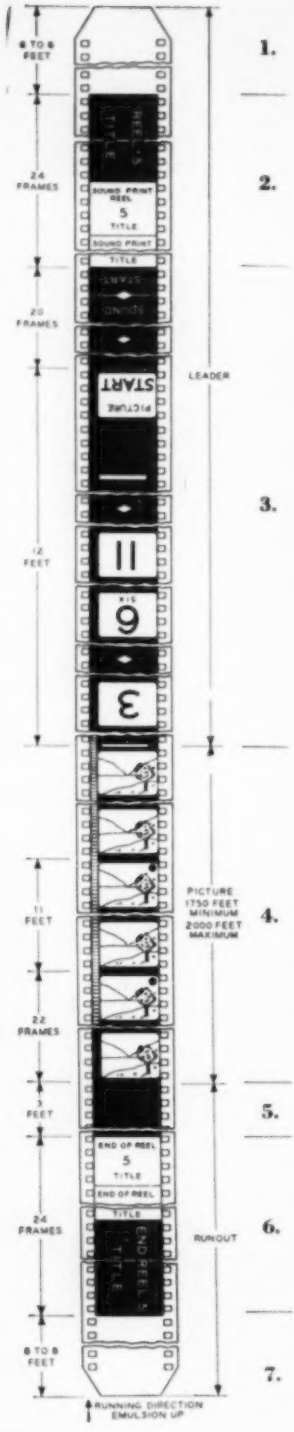
6.1 The identification tail leader shall contain 24 frames as specified below:

(a) 18 frames on each of which are plainly printed in black letters on white background: (a) end of reel, (b) reel number (Arabic numeral not less than ¼ of frame height), and (c) picture title.

(b) 6 frames on which are plainly printed, lengthwise with the film, in white letters on black background: (a) end of reel, and (b) picture title.

7. Protective Tail Leader

7.1 The protective tail leader shall be the same as the protective head leader.



* To obtain the transparent outline, the use of a serrated die has been recommended. However, the following alternate method may be used: Insert in the base side of the cue mark hole in the negative a skewer of hard rubber or hard wood which has been dipped in coding ink, and rotate the skewer slightly in the film in order that the ink will form a thin ring around the edge of the hole. Only a very small amount of ink is necessary.

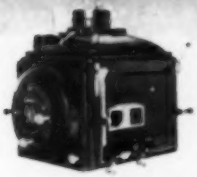
Screen Brightness for 35-mm Motion Pictures (Z22.39–1944)

1. Screen Brightness

1.1 The brightness at the center of a screen for viewing 35-mm motion pictures shall be 10 +1, −3 foot-lamberts (9 to 14 foot-lamberts) when the projector is running with no film in the gate.

(CONTINUED ON PAGE 8)

MIGHTY "90"
75-150 Ampere
High Intensity
for screen widths more than 24 feet.



MOGUL
45-70 Ampere
High Intensity
for screen widths up to 34 feet.

PORTABLE
18 Ampere
Low Intensity
for screen widths up to 12 feet.

NOW CELEBRATING
THE 30TH
ANNIVERSARY OF
THE Strong
ELECTRIC CORPORATION
TOLEDO 2, OHIO

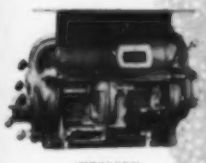
THE WORLD'S LARGEST
MANUFACTURER OF
PROJECTION ARC LAMPS

More dealers sell, and more theatres buy Strong-made lamps than any other kind.

As the only lamps produced complete within one factory, Strong lamps can be engineered to obtain the highest efficiencies ever attained.

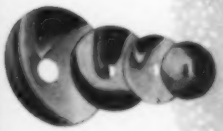
UTILITY
40 Ampere
High Intensity
for screen widths up to 20 feet.

JUNIOR HIGH
30 Ampere
High Intensity
for 16 mm projection on screens up to 16 feet wide.



UTILITY
One Kilowatt 40 Ampere
High Intensity
for screen widths up to 18 feet.

RECTIFIERS
Strong also produces a line of dependable rectifiers which includes one designed especially for use with each lamp. All assure smooth output current, long tube life, low operating temperatures, and flexibility in control.



PRECISION REFLECTORS
for all makes and models of projection arc lamps.

TROUPER
High Intensity
Arc Spotlight.

TROUPETTE
Incandescent Spotlight.

Dimensions for Projection Rooms and Lenses for Motion Picture Theatres (Z22.28–1946)

1. Projection Lens Height

1.1 The standard height from the floor to the center of the projection lens of a motion picture projector should be 48 inches.

2. Projection Angle

2.1 The projection angle should not exceed 12 degrees.

3. Observation Port

3.1 The observation port should be 12 inches wide and 14 inches high, and the distance from the floor to the bottom of the openings shall be 48 inches. The bottom of the opening should be splayed 15 degrees downward. If the thickness of the projection room wall should exceed 12 inches, each side should be splayed 15 degrees.

4. Projection Lens Mounting

4.1 The projection lens should be so mounted that the light from all parts of the aperture shall traverse an uninterrupted part of the entire surface of the lens.

5. Projection Lens Focal Length

5.1 The focal length of motion picture projection lenses should increase in ¼-inch steps up to 8 inches, and in ½-inch steps from 8 to 9 inches.

6. Projection Objectives, Focal Markings

6.1 Projection objectives should have the equivalent focal length marked thereon in inches, quarters, and halves of an inch, or in decimals, with a plus (+) or minus (—) tolerance not to exceed 1 percent of the designated focal length also marked by proper sign following the figure.

Dimensions for Theatre Projection Screens (Z22.29–1948)

Size No. of Screen	Over-all Width (feet)	Over-all Height (feet)	Minimum Effective Picture Size (feet)	
8	8.00	6.00	7.50	5.50
9	9.00	6.75	8.50	6.25
10	10.00	7.50	9.50	7.00
11	11.00	8.25	10.50	7.75
12	12.00	9.00	11.50	8.50
13	13.00	9.75	12.50	9.25
14	14.00	10.50	13.50	10.00
15	15.00	11.25	14.50	10.75
16	16.00	12.00	15.50	11.50
17	17.00	12.75	16.50	12.25
18	18.00	13.50	17.50	13.00
19	19.00	14.25	18.50	13.75
20	20.00	15.00	19.50	14.50
21	21.00	15.75	20.50	15.25
22	22.00	16.50	21.50	16.00
23	23.00	17.25	22.50	16.75
24	24.00	18.00	23.50	17.50
25	25.00	18.75	24.50	18.25
26	26.00	19.50	25.50	19.00
27	27.00	20.25	26.50	19.75
28	28.00	21.00	27.50	20.50
29	29.00	21.75	28.50	21.25
30	30.00	22.50	29.50	22.00

1. Scope and Purpose

1.1 This standard specifies dimensions for projection screens used for viewing motion pictures.

2. Screen Size

2.1 Sizes of screens shall be in accordance with the table below.

2.2 The over-all size shall be measured from the outer edge of border to the outer edge of opposite border. The ratio of the over-all width to over-all height shall be 4 to 3.

3. Border

3.1 A fabric reinforcing border shall surround the screen. The width of this border shall be from 2.5 to 3 inches.

4. Grommets

4.1 Metal mounting grommets, size No. 3 or No. 4, shall be securely fastened through the fabric border.

4.2 Grommets shall be spaced on 6-inch centers, starting from grommets located at the centers of the four sides of the screen, except that there shall also be a grommet in each corner of the screen. Grommets shall be set in a line parallel to the edge of the screen, with their centers from 1.0 to 1.31 inches inside the outer edge of the border.

5. Selection of Screen Size

5.1 The width of the screen should be not less than 1/6 of the distance from the center of the screen to the most remote seat.

5.2 The distance between the screen and the front row of seats should be not less than 0.87 foot for each foot of screen width.

Theatre Sound Test Film for 35-mm Sound Systems (Z22.60–1948)

1. Scope and Purpose

1.1 This standard describes a film for qualitatively checking and adjusting 35-millimeter motion picture sound reproducers and for judging the acoustical properties of the auditorium in which the sound is reproduced.

2. Test Film

2.1 The film shall have a sound track and accompanying picture. The sound track shall comply with American Standard Sound Record and Scanned Area, Z22.40-1946, and the film stock used shall be cut and perforated in accordance with American Standard Cutting and Perforating Dimensions for 35-Millimeter, Motion Picture Positive Raw Stock, Z22.36-1947, or any subsequent revisions thereof.

2.2 The test film shall contain samples selected from studio feature pictures by an appropriate engineering committee of the Motion Picture Research Council and the Society of Motion Picture Engineers. The following sound samples are typical of those which may be included:

(a) Main title music
(b) Dialogue
(c) Piano
(d) Orchestral music
(e) Vocal music

2.3 The assembled film shall include appropriate samples of typical release-print material intended to provide a qualitative check of such reproducing system characteristics as:

(a) Frequency response
(b) Volume range
(c) System noise
(d) Power-handling capacity
(e) Flutter

2.4 Each film shall be provided with head and tail leaders as specified in American Standard Specifications for 35-Millimeter Sound Motion Picture Release Prints, Z22.55-1947, or any subsequent revision thereof. The main title shall include the issue number of the film so that revised versions, which may be issued periodically to conform to changing studio practices,

(*Continued on Page 29*)

Arclamp Generators

By ROBERT A. MITCHELL

III. Inspection and Trouble-Shooting Chart*

MOTOR-GENERATOR sets should be placed in a dry, well-ventilated room especially prepared for their occupancy. A cellar location is satisfactory if perfectly dry; but it is better to have the set installed in a small room immediately adjoining the projection room in order that the projectionist may observe the set from time to time.

The projection room itself, however, is not the best place for a generator. Some local and state ordinances forbid its installation there. Then, too, many projection rooms—mere booths—are too small to make the invasion of so ponderous a room-mate a welcome event. And the motion picture machines subject the projectionist to all the heat and noise he should be asked to endure. Let the motor-generator, therefore, be banished out of sight and earshot to quarters of its own.

Having determined a suitable location for the machine—together with associated switchboards and ballast rheostats—extreme care should be taken to mount the set *perfectly level* on a suitable bed. As to the bed, manufacturers' instructions will be found most helpful. As a rule, a base of concrete upon which are placed a layer of cork and a layer of planking, each 2 inches thick, will be found satisfactory. Several modern sets are so light and solidly built that they require only bolting of the bedplate to planking, under which a thick layer of cork serves to deaden vibration.

Again the value of adequate ventilation is stressed, even though most generator sets are made to withstand high temperatures. It is desirable that a fan of proper capacity be installed in the generator room and positioned so that it draws cool air in around the generator and exhausts the warm air through an outlet near the ceiling.

Generators Need Little Care

When properly installed and wired up, the motor-generator needs little care beyond periodic cleaning, inspection, lubrication, and replacement of worn brushes. Immediate attention should be given to any defects which may be revealed during actual use or through the periodic inspections.

Generators usually go for many years, operating day in and day out, before the commutator wears to such an extent that it needs truing in a lathe.

Every projectionist learns by experience that inspections, even when apparently unnecessary, provide advance notice of trouble. But it is also well to remember that really thoughtful inspections by a conscientious, observant projectionist are of much more value than careless, routine once-overs.

INSPECTION SCHEDULE

ONCE A WEEK. Check the bearings. Apply lubricant when necessary, either oil or grease *according to the manufacturer's instructions.* Use dynamo oil, not ordinary oil which may contain acidic substances that corrode bearings. Use bearing grease, not vaseline which melts and runs off.

Where an oil gauge is used with sleeve bearings, fill to line on the gauge when the generator is stopped.

If ball bearings, test the temperature of each bearing by feeling the bearing housings with the hand while the generator is running. (Be careful!) Heating usually indicates a bearing overfilled with grease. Also take note of any unusual vibration which may be felt. Listen to the bearings—clicking sounds indicate a cracked or nicked ball. A "listening rod" or physician's stethoscope are useful for checking the condition of ball bearings.

The bearings of vertical-type motor-generator sets require special care. As a rule, the lower bearing requires twice as much lubrication as the upper. Old-style vertical generators are apt to "roar," but this noise cannot be helped—it's the nature of the beast. In units where the motor drives the dynamo by means of a belt or through a flexible coupling, both the generator and the motor bearings require an equal amount of care.

Check couplings for misalignment, wear, loose coupling bolts, damaged finger-pins, discs, etc. Check belts for condition and tightness. The voltage of belt-driven dynamos can be stepped up, if desired, by placing a slightly larger pulley on the driving motor shaft. The faster the dynamo armature revolves, the higher the output voltage. But there are limits beyond which it would be unsafe to venture.

ONCE A MONTH. Examine commutator, brushes, brush-holders, and brush shunts (pigtails). Rough or scored commutators should be smoothed by judicious use of a commutator stone or with No. 00 sandpaper (*not emery paper!!!*)

The Motiograph 70, 140 ampere Hi-Power generator, a modern vertical-type machine designed for use with all simplified high-intensity lamps. Ribbon-wound ballast resistors are placed in the base of the machine where they are efficiently cooled.

wrapped over the butt of a stout stick. Use the plain side of the sandpaper for final polishing, afterwards cleaning the commutator with a lint-free rag. Dress with a trace of vaseline. High mica insulation between commutator bars should be undercut about 1/16 inch below the surface of the bars.

Commutator and Brushes

Inspect commutator for loose bars, tightening the "V" clamping ring if necessary, following the manufacturer's instructions.

Short brushes should be replaced. When renewing brushes, replace all of them, and use only the type and grade specified by the manufacturer. See that the brushes are seated properly on the commutator, that the pigtails are connected tightly, that they do not interfere with the brush rigging, and are not accidentally grounded.

Brush pressure should be checked every time the brushes are replaced or cleaned. About 1½ pounds per square inch of brush surface is correct.** Make sure that the brushes are free to slide in the brush boxes, yet not so loose that they chatter when the machine is in operation. Inspect the interior surfaces of the brush boxes for accumulations of grime and for wear.

Blow all dust and dirt from the generator with a hand bellows. Clean ac-

* Last of a series of three articles on the development, application and maintenance of generators.

** To determine pressure required by any brush, multiply the width of the brush face by the length of the face by 1½. Test brush pressure with small spring scale.

cessible parts of armature with a soft rag, *not* cotton waste or other linty material.

ONCE A YEAR. Check air gaps (distance separating armature and field pole-pieces) with feeler gauges, taking readings at top, bottom, and both sides. The gap, measuring from 0.005 to 0.020 inch depending on make and model, should be uniform all the way around. A displaced gap may result in inefficient operation, heating of armature coils, and rubbing of the armature against the field pole-pieces. It is corrected by shimming the bearings or replacing worn bearings.

If the output voltage of the generator falls off for no apparent reason, or fluctuates erratically, check all arc circuits and ballasts for loose connections and possible shorts and grounds. The ballast rheostats need examination about once a year.

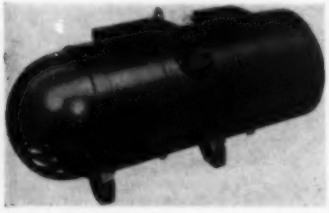
Test the insulation resistance of the generator with either a "meggar" (megohm-meter) or a circuit tester consisting of several dry-cells in series with a DC voltmeter. First make a test of the complete generator in the following way:

(1) Disconnect generator from arc-lamp circuit in order to isolate the machine electrically.

(2) Attach one lead-wire from the meggar or circuit tester to some part of the generator frame free from paint and dirt. Connect the other lead to any exposed conductor or wire in the generator—a brush pigtail, for example. If a meggar is used, the insulation resistance should be greater than 1 megohm (one million ohms). If the battery circuit-tester is used, the voltmeter needle should not move. (There may be a slight movement of the needle when the connection is made or broken, due to a condenser effect, but the needle should remain at "0 volts" during the test.)

In the event that the above test reveals that a ground exists in the generator, the next step is to find out whether it exists in the field or the armature.

(1) Disconnect generator from arc circuit.



The Motiograph 115 230 ampere Hi-Power generator, a versatile horizontal-type generator set for the larger high-intensity arcs.

(2) Lift all brushes from the commutator so that field and armature coils can be tested separately.

(3) Attach one lead-wire from the circuit tester to the generator frame, and connect the other lead to a brush pigtail. Repeat the test by connecting the tester lead to another brush lug. This will test the brush rigging, the field coils, and the field rheostat with associated wiring.

(4) Connect one tester lead to the generator shaft, and connect the other to a length of fine bare copper wire wound several times around the commutator so as to contact all of the bars. This will test the armature alone.

(5) When the generator "shunt" field is magnetized by a separate exciting dynamo, the exciting circuit with its dynamo, field resistors, control rheostat, etc. should be tested separately.

A complete overhaul of the generator is in order if leaks due to faulty insulation are discovered. To neglect so serious a defect is to invite complete breakdown of the generator.

At least once a year drain old oil from the wells of sleeve bearings. Flush the bearings, first with white kerosene, then with dynamo oil. Refill with acid-free mineral oil of the grade recommended by the manufacturer of the machine.

Check end-play of horizontal sleeve-bearing generators, allowing sufficient play (about 3/16 inch) to permit the armature to "float" in the magnetic field, thus maintaining the electrical efficiency of the machine and minimizing grooving of the commutator.

EVERY TWO YEARS. Dismantle the generator and clean it thoroughly. Check bearings for wear. See that all windings are tight.

Ball bearings should be washed with carbon tetrachloride (poisonous!) or naphtha (inflammable!) and repacked with fresh grease. *Only the recommended ball-bearing grease should be used.* Clean out grease cups and bearing housings, and fill the bearings *only one-half full* of grease. Use no more than this, as overgreasing causes overheating with extra wear and tear on the generator and driving motor.

Trouble-Shooting Chart for Generators

This chart is concerned only with the dynamo component of motor-generator sets. For a DC motor chart refer to IP for January 1951, p. 6. For 3-phase AC motors (the usual type) see IP for February 1951, p. 16. The following chart may be used to shoot both HI and LI direct-current generators of the multiple-arc type.

1. BEARINGS TOO HOT

Trouble: Bearing dry. *Cause:* Insufficient lubrication or wrong type of lubricant used. *Remedy:* Clean bearings and refill with fresh oil or grease of the type recommended by the manufacturer of the motor-generator set.

Trouble: Ball Bearing overfilled. *Cause:* Careless or too frequent lubrication. *Remedy:* Clean out bearings and housings, and repack bearings by filling them no more than half full of ball-bearing grease.

Trouble: Bearing dirty. *Cause:* Dust or dirt in oil or grease. *Remedy:* Clean out oil reservoir or grease cups, flush out the bearings with carbon tetrachloride, naphtha or kerosene, and refill with proper lubricant.

Trouble: Tight bearing. *Cause:* Insufficient lubrication, or undersize bearing if bearing is a replacement. *Remedy:* Provide lubrication. Polish shaft with fine emery paper, or replace bearing.

Trouble: Bearing binding. *Cause:* Shaft "sprung," or motor out of line with generator in 4-bearing units. *Remedy:* "True" the shaft in a lathe, replace armature if shaft is badly bent, renew bearings, re-align motor with generator.

Trouble: Loose bearing. *Cause:* Vibration and wear. *Remedy:* Tighten screws holding bearing. Replace worn bearing. Correct faulty supporting base upon which the machine rests.

2. ENTIRE FRAME TOO HOT

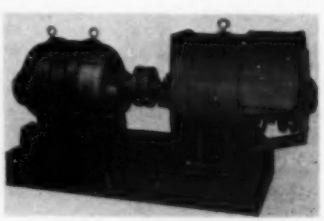
Trouble: Transference of heat from bearings or armature. *Causes and Remedies:* See Causes and Remedies under 1 and 3.

Trouble: Transference of heat from motor. *Causes and Remedies:* See the motor trouble-shooting charts previously referred to. (IP for January and February, 1951.)

Trouble: Transference of heat from field coils. *Causes:* Short-circuits in arc-lamp circuit, shorted coils in generator. *Remedy:* Correct grounds or shorts in arc circuit to decrease load on series field, remedy ballast rheostats which may be shorted or not of sufficient ohmic value. Test shunt field with 45-volt B battery, replacing coils which do not exert a magnetic pull on a screwdriver. (When making this test for shorted field coils, be sure that polarity is correct—positive terminal of battery to positive terminal of field coils,—else residual magnetism of the electromagnets may be reversed, giving rise to further trouble. See under Item 9.)

3. ARMATURE TOO HOT

Trouble: Circuit overload. *Cause:* Shorts

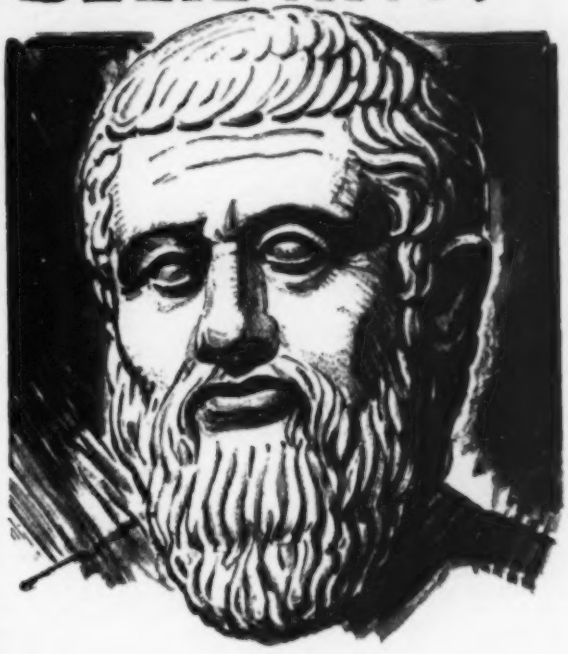


Hertner Transverter motor-generator set, Type CP 200/300.

SEEING IS BELIEVING!

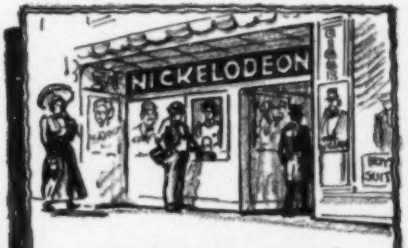
WHAT THE ANCIENTS THOUGHT...

PLATO (347 B.C.) BELIEVED THAT THE EYE **PROJECTED ITS OWN LIGHT,** WHICH MET AND BLENDED WITH THE "FORM" THAT WAS THOUGHT TO FLOW CONTINUOUSLY FROM EACH OBJECT OF SIGHT



TODAY WE KNOW...

THAT, IN SEEING, THE EYE IS STIMULATED BY INNUMERABLE POINTS OF LIGHT **REFLECTED BY THE OBJECT**...THAT THE BRAIN INTERPRETS THESE POINTS AS A TOTAL IMAGE OF THE OBJECT.



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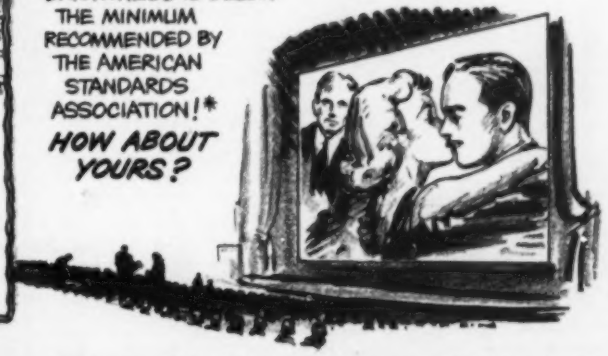
LATEST SURVEYS INDICATE THAT IN **ONE OUT OF EVERY FOUR** U.S. THEATERS, SCREEN BRIGHTNESS IS BELOW THE MINIMUM RECOMMENDED BY THE AMERICAN STANDARDS ASSOCIATION!* **HOW ABOUT YOURS?**



*Report on Screen Brightness Committee Theatre Survey, Journal SMPTE, September, 1951.

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in arc wiring, ballast resistances shorted, generator not of sufficient capacity to handle the projection arcs for prolonged periods of time. *Remedy:* Correct electrical defects in external circuit, and make sure that the generator is big enough to deliver proper arc current when both arcs are burning at the same time.

Trouble: Armature out of center between poles. *Cause:* Worn bearings. *Remedy:* Replace bearings.

Trouble: Moisture in coils. *Cause:* Water dripping onto the generator, or operating in a damp place. *Remedy:* Dry out by running for several hours with no load. Move the machine to a drier location.

4. SPARKING OF BRUSHES

Trouble: Brushes not properly set with regard to the field winding. *Cause:* Misadjustment of the brush rockers, or yoke shifted to one side of the commutator "neutral point" which prevails under normal load. *Remedy:* Check the brush rockers and replace all defective rigging. Set the brush yoke so that the punch mark on yoke and frame are exactly opposite each other. If this measure does not decrease sparking, determine by experiment the position of least sparking when one arc is burning normally, set the yoke at that point, and write to the manufacturer for further instructions anent brush setting.

Trouble: Brushes cover too many commutator bars. *Cause:* Brushes too thick. *Remedy:* Use brushes of proper thickness. Replace brush-holders if they show signs of wear.

Trouble: Brushes too short. *Cause:* Wear. *Remedy:* Put in a new set of brushes.

Trouble: Poor contact between brush and commutator. *Cause:* Oil or dirt on commutator. Grit in brush. *Remedy:* Remove dirt from slots between the copper bars by means of a pointed stick, wipe commutator with a clean rag, then dress it with a trace of vaseline applied to a cloth pad. Remove dirt and oil from the brushes with carbon tetrachloride. (Avoid breathing the fumes of this volatile poison.) If brushes contain grit, replace with brushes of better quality.

Trouble: Rough or uneven commutator. *Cause:* Vibration, different quality of bars, and uneven ridges where brushes do not wear the commutator. *Remedy:* If the trouble is slight, the roughness may be removed with a commutator stone or 00 sandpaper (NOT emery paper). Otherwise the commutator should be trued in a lathe.

Trouble: High, low, or loose bars. *Cause:* Clamping cone (V ring) loose. Commutator mishandled. *Remedy:* Press the high bars back into place, raise the low bars, carefully tighten V-ring locknut or set-screws, and lastly, true the commutator in a lathe, undercut the mica, and dress with trace of vaseline.

Trouble: High mica. *Cause:* Commutator wear. (Copper wears down more rapidly than mica. When undercut, as it should be, the mica does not wear down at all.) *Remedy:* With a sharp steel tool undercut the mica about 1/16 inch below the surface level of the copper bars. Chamfer the edges of the copper bars with a V tool to remove burrs, wipe free of dust, and dress the commutator.

Trouble: Excessive current. *Cause:* Load too great for generator. *Remedy:* If there are no leaks or grounds in the arc-lamp circuit, or short-circuits in the generator shunt field, obtain a generator suitable for the carbon trim in use.

Trouble: Grounds in armature or commutator. *Cause:* Defective insulation. *Remedy:* Remove ground if possible or, if not, cut out the grounded armature coil and bridge grounded commutator bar. (The grounded coil should be rewound, or the armature replaced, at the earliest opportunity. Note, however, that although grounded armature coils may be cut out and bridged over in an emergency, shorted, grounded, or open field coils must never be bridged.)

Trouble: Commutator bars short-circuited; mica worn or chipped away, causing deep pits between bars. *Cause:* Copper or carbon dust between commutator bars, or melted solder from leads flowing in between bars. *Remedy:* Remove foreign matter from the slots between the bars, and paint the exposed mica insulation with glossy red enamel of the iron-oxide or synthetic type. Use a fine, pointed camelhair brush for this purpose.

5. BRUSHES SING

Trouble: Brush pressure too great. *Cause:* Brush-holder springs not properly adjusted. *Remedy:* Decrease brush tension to the amount recommended by the manufacturer.

Trouble: Brushes of the wrong type used. *Cause:* Brushes probably too hard. *Remedy:* Use brushes recommended by the manufacturer of the generator. Lacking this information, try a softer grade of graphite brush to eliminate singing.

Trouble: Dirty commutator. *Cause:* Improper dressing of commutator, dust and dirt from air, over-lubrication of generator, loss of copper-oxide film. *Remedy:* Clean the commutator, dress with trace of vaseline, wipe off excess from commutator. (A properly dressed commutator will have a thin chocolate-brown film of copper oxide on its polished surface. Once established, this "tarnish" should not be removed. Trouble has frequently been experienced with motors and generators in aircraft flying at high altitudes because of insufficient atmospheric oxygen. Just why this brown oxide film is necessary for satisfactory commutation is anybody's guess.)

6. BRUSHES CHATTER

Trouble: High bars. *Cause:* The cone or V ring holding bars has become loose. *Remedy:* Carefully drive high bars back into place and tighten cone at end of commutator. Smooth commutator with a stone or true in a lathe. Undercut the mica to a depth of 1/16 inch, chamfer commutator bars if edges are burred, clean and dress.

Trouble: Low bars. *Cause:* Wearing away due to soft bars. *Remedy:* Loosen cone and lift low bars. If mica insulation of cone is cut through, replace to avoid short-circuiting of commutator. True commutator and dress.

Trouble: High mica. *Cause and Remedy:* See under Symptom 4.

Trouble: Loose bars. *Cause:* Cone or V ring loose. *Remedy:* Even up bars and tighten cone. As a safeguard, test commutator for grounds with any circuit-testing device. Finally, true the commutator, undercut the

(*Continued on Page 30*)

Pacent, Sound Pioneer, Passes

Pioneer manufacturer of talking picture equipment and early experimenter in radio, Louis Pacent, head of Pacent Engineering Corp. died suddenly last month at the age of 58.

One of the first of all "independent" theatre sound equipments was Pacent's. This was when sound still came to the theatre on disc rather than on a track. Pacent's turntable was the first in America to be pedestalled at a height convenient to the projectionist so the latter could change records and adjust the needle without stooping almost to the floor, as other equipments then required. During the depression Pacent equipment disappeared from the theatre market, but his company continued to manufacture apparatus to specification for Western Electric Co., RCA, General Electric and Westinghouse.

Louis Pacent's interest in radio and experiments with it began in 1909, when he built himself a "ham" station at the ripe age of 15. His experiments with talking pictures date back to the 1920's, and he was consultant to Warner Brothers during their development of apparatus leading up to "The Jazz Singer."

Surviving are Mrs. Pacent and two sons, Homer Cosmo and Louis Gerard, Jr.

TESMA Meets Nov. 15-19

Theatre Equipment and Supply Manufacturers Association and Theatre Equipment Dealers Association will hold their annual joint trade show and convention in Chicago's Hotel Morrison on November 15th to 19th, jointly with Allied States Association of Motion Picture Exhibitors.

Heads of the three organizations: Bob Hoff of Tesma, Ray G. Colvin of Teda, and Jack Kirsch of Allied, met in Chicago last month to organize and announce the details. Exhibits open 2:00 p.m. Saturday the 15th; the Tesma-Teda luncheon is slated for noon, Sunday the 16th; the Teda party is set for 8:00 p.m. Tuesday, and the gathering will conclude on a high note with the cocktail party and banquet on Wednesday evening. Plans for exhibition of theatre equipment items will be announced by Tesma beginning early in June.

Kodak Sales Steady

Eastman Kodak Co.'s estimated consolidated sales for the first quarter of 1952 totalled approximately $119 million as compared with $120 million for the same period of 1951, Thomas J. Hargrave, president, told shareholders at their annual meeting at the end of April. Eastman Kodak now has 49,600 employes, he revealed. Shareholders total nearly 70,000 of whom 3,000 are employes.

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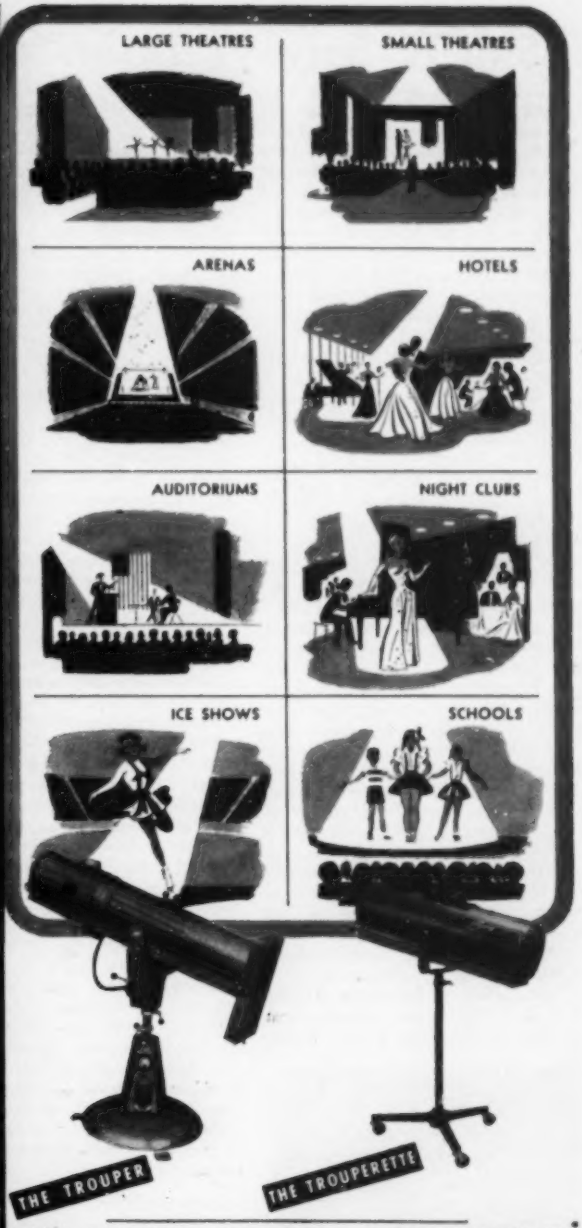

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SMPTE Surveys Technical Aids to Theatres

By HENRY B. SELLWOOD

SMPTE members convening in Chicago last month sent their engineering imaginations forward into a future of stereoprojection and television, and nostalgically backward to a past of "One Minute Please to Change Pictures."

The Society of Motion Picture and Television Engineers met in Chicago's Drake Hotel. It was their 71st semi-annual convention; and lightened, as usual, with a luncheon, cocktail hour, banquet, dance and entertainment. These diversions were near necessities, for the technical schedule was very heavy.

A total of 52 papers were presented, including one so very intricate that engineers present asked for further elaboration in the form of a written report.

"Today . . . an interest in engineering is developing quite generally among motion picture people who have not had technical training or experience," Peter Mole, President of the Society, said in welcoming the members and guests. "Evidence appears in many places —in plans of motion picture interests to appear before the Federal Communications Commission in the matter of Theatre Television—in current efforts to produce stereoscopic motion pictures for theatre release—in the first steps toward extending the field of view of theatre patrons through changes in screen design or illumination of the surrounding area—and in widespread introduction of new or enlarged facilities for release printing in color."

President Mole did not anticipate that any one of these developments by itself would prove the salvation of the box office; he pointed to them as "clear evidence of a trend toward technical improvement."

Nathan Halpern, President of Theatre Network Television, Inc., predicted that in time every motion picture theatre would be equipped with TV as a matter of course. At present 75 theatres in 37 cities from coast to coast are so equipped, he estimated. Theatre TV will "erupt suddenly," he believes.

James Frank, Jr., Deputy Director of the Motion Picture and Photographic Products Division of the National Production Authority, reported probable easement of materials shortages in most commodities. One reason, according to Frank, is increased production; steel output is up 10 percent since the Korean shooting started and will continue to rise to 120 million tons per year. Aluminum production will eventually reach double the pre-Korean output. But copper and nickel-steel remain in short supply.

Dr. W. R. G. Baker, vice president and general manager of General Electric Company's Electronics Division, reported rapid progress by the National Television System Committee in collecting field test data bearing on problems of color television. These studies were concerned with making the fullest possible use of available TV frequencies. "The spectrum," he said, "is a national resource. To use it inefficiently is the same as wasting any other national resource."

Conspicuous at the Convention, in addition to the emphasis on television and on stereoprojection, was the new importance of magnetic recording on film. Although reports to the Convention did not indicate any present use of magnetic recording on 35-mm film, but only on 16-mm, the interest in the 16-mm field is intense, and a number of equipments were demonstrated. Three varieties of 16-mm sound track are now available; optical, magnetic and magneto-optical. The last is a double track, one-half magnetic and the other optical, lying side by side along the film; each of only half the normal width. The Society is undertaking a study of these recently-developed practices with a view to standardization.

Peter Mole (left), president of the SMPTE and president of Mole-Richardson Co.; Dr. W. R. G. Baker (center), chairman of the National Television System Committee of the Radio-Television Manufacturers Association and vice-president of General Electric Co., and Herbert Barnett, executive vice president of General Precision Labs., gather to discuss color TV field tests at the recent convention.

Stereo and TV

A device, contrivance, invention or whatever one wants to call it that applies both to three-dimensional projection and also to full-color television was analyzed mathematically by Sam H. Kaplan, consultant, of Chicago. This is the "parallax barrier." Physically it consists of an arrangement of parallel wires, or slits, or rows of lenses. "A parallax barrier may be defined as a masking device which when interposed between an object space and an image space, prevents any given part of the image space from being sighted from any but a given set of preferred directions," the speaker explained.

If a barrier of this type is arranged in front of a motion picture screen each of the two eyes of the observer views the screen through a different set of slits and therefore sees a different image. When each eye sees a different image, the conditions necessary for three-dimensional viewing have been met. Practical difficulties include arranging and spacing these slits so they apply to all seats in a theatre and not just to a few; and also in calculating such generous provisions that patrons can move their heads without losing sight of the picture.

The geometrical optics of these requirements were analyzed in considerable detail, the possibilities and difficulties were computed.

Credit for the paralax barrier was given to "Berthier of France who suggested it in 1896. Frederick E. Ives applied it first to produce stereoscopic still pictures in 1904. . . . A barrier with a multitude of elements behind each barrier aperture, instead of only two, was invented by C. W. Kanolt, who obtained U. S. Patent No. 1,260,682 on March 26, 1918. . . . A radial type non-parallel type barrier was invented by B. T. Ivanoff (who has used it to show three-dimensional motion pictures in Russia). The substitution of lenses as an alternate to mechanical blocking barriers was first proposed by Gabriel Lippmann in France in 1908."

Purpose of the lenses is to compensate for light loss. "One defect in the practical application of parallax barriers is the light loss introduced by the barrier itself. This limitation can be minimized by replacing each aperture or slit by a corresponding spherical or cylindrical lens. . . . Replacing the aperture by a larger size lens can theoretically

George Colburn (left), head of George W. Colburn Labs.; William C. DeVry, president of DeVry Corp., and Oscar F. Neu, president of Neumade Products Corp., prepare to enact their respective roles as amateur entertainers at the SMPTE banquet.

cut the barrier loss to *zero*. Instead of acting as a mechanical barrier, the lenses refract or converge the rays to the proper position on the image surface. In stereoscopic picture processes modern practice calls for lens elements molded into the film base."

Where the principle of parallax barrier is used for color TV the barrier is located inside the TV picture tube "as a positive means of insuring that portions of a mosaic screen are subjected to bombardment by a predetermined electron beam." This invention is credited to Dr. Warner Fleshig and first revealed in German patent No. 736,575 applied for in 1938. Since it "deals with electron rays instead of light, electron lenses can be used . . . the apertures themselves can act as (electron) lenses. . . . A large number of tricolor picture tubes are being built on this principle. Up to the present the application of the parallax barrier principle in a cathode-ray tube represents the most promising solution for all-electronic color television."

"One Minute Please While . . ."

"One Minute Please to Change Pictures" was the smaller of two slogans displayed by a very, *very* old-time slide projected by Arthur J. Hatch of Strong Electric Corporation in the course of demonstrating the effectiveness of the very modern Strong high intensity slide projector. The projector, which can brilliantly spread the image of a 3-inch slide across a 35-foot screen, not only invited the assembled engineers to wait one minute while the operator changed reels, but also to "Chew White's Yucatan Gum"—"Please Remain Seated, the show is not over" (this one illustrated by a tinted view of shrimp boats or some kind of sailboats a-comin'), and—"To vote AGAINST PROHIBITION, mark ballot thus:" (under which is shown the facsimile of a ballot and the date: November 6th, 1917). And last, fully illustrated with pickaninnies in brilliant red ballet skirts: "We'd rather be bright than be President, let the GOLD DUST TWINS do your work." According to the recollections of the oldest old timers consulted none of these slides could have been shown in a theatre later than World War I and most probably go back to about 1912 or 1914; to a time when such brilliance of slide projection as was obtained from the Strong unit represented only a dream as improbable as "pictures by wireless."

New Screens

A stereoprojection screen system for three-dimensional viewing and the recently-developed Schlanger-RCA Synchro-Screen were described at the Tuesday morning session.

Strong Electric Corp's high-intensity slide projector, shown here, amused assembled engineers by flashing an old "One Minute Please to Change Pictures" slide of nickelodeon vintage. Same projector was used throughout the convention for the more serious purpose of presenting slides with which engineers illustrated their technical papers.

The Synchro-Screen (*see IP for January, 1952, page 16, and for February, 1952, page 18*) was described in a paper prepared by Benjamin Schlanger, his associate William A. Hoffberg, and Charles R. Underhill, Jr., of RCA, and delivered by R. H. Heacock of RCA. The same screen was on view at Eitel's (formerly RKO's) Palace Theatre in Chicago, with "Singing in the Rain," where registrants at the SMPTE Convention were admitted without charge on presenting convention identification cards.

A "Cyclostereoscope" screen system for three-dimensional viewing without viewing spectacles was described in a paper prepared by Pierre Vanet, of Paris and W. Wheeler Jennings of Chicago, and read by Mr. Jennings. Essential feature of the system is a huge, rotating, cone-shaped grill which surrounds the screen. The grill is built of 108 aluminum bars that slope inward 20°. This structure revolves; the screen is viewed through the spaces that separate the aluminum bars. With suitable film, within lateral viewing angles of 40° and within viewing distances between 2½ and 6 times the screen width, stereoscopic effect is produced, it was claimed.

Projectionists Solved the Problem

". . . projectionists at the M. G. M. laboratory, who had been informed of our problem and had built a model of their own . . . solved the excess heat problem," said Harry Brueggemann of Cinecolor Corporation in the course of his paper, "Continuous Arc Projector Light Meter." According to Cinecolor's experience, it was explained, standard arc lamps may vary in light output by as much as 20 percent in 10 minutes. "This variation, of which the projectionist has no indication . . . would probably never be noticed in a theatre" but it is far too much for the studio worker who is attempting to blend the intensities of successive scenes in a pleasing manner. An automatic compensation, based on a photo-electrically controlled thyratron which in turn governs the carbon feed motor, was considered and rejected as too expensive. "The only system which seemed feasible would make use of a photovoltaic cell type meter, so arranged as to keep the projectionist continually informed as to the light output . . ."

A Weston Photronic cell type RR, and a 0-20 microammeter were used, the latter mounted "just below the viewing port, so that the projectionist can see the screen and the meter at the same time." To supply energy to the photronic cell a piece of optically flat, unsilvered glass was mounted in the mechanism, in the light path, at an angle of 45°. Approximately 90 percent of the light continued along the usual path; some 10 percent was deflected at right angles. This loss was readily compensated by trimming the arc.

Metering Under Difficulties

The difficulty solved by the M. G. M. projectionists lay in the fact that the 10 percent of energy, both light and heat, amounted to too much for the photronic cell. A dense green glass placed ahead of the cell "cut down the light to a workable level" but the heat came through and raised the temperature of the cell too high for stability, so an Aklo heat glass was added. This promptly cracked. Thus it was evident that another means of reducing the heat was necessary. Ventilation slots were cut into the casting holding the cell, and this helped some, but the Aklo glass still would not stand up.

"At this point the projectionists at the M. G. M. laboratory . . . thought of replacing the dense glass filter by a sheet of brass shim stock with pinholes." Further, whereas the first Cinecolor model had used a bakelite mounting, the M. G. M. projection staff designed a "metal encased cell for conduction cooling. The M. G. M. modifications resulted in a cell mounting which was only slightly warm to the touch, even after many hours of continuous operation."

Credit for the ultimate perfection of the continuous arc light meter was given by the speaker to Chief Projectionist James Phillips of Cinecolor; and Chief Projectionist Merle Chamberlain, and Projection Engineer Clayton C. Troxel, Jr., of M. G. M.

Problems of "Motion Picture Theatre Installations Aboard Naval Vessels" and especially the smaller ones introduced

(*Continued on Page 23*)

IN THE
SPOTLIGHT

AN ESTIMATED 1,000 representatives of IA Local Unions throughout the United States and Canada gathered in the ballroom of the St. George Hotel, Brooklyn, N. Y., on April 19 last to honor General Secretary-Treasurer William P. Raoul at a testimonial dinner sponsored by the 10th District.

Since the honor guest's home city is Atlanta, Ga., the members of Brooklyn Stagehands Local 4 built a facade of a pre-bellum Southern mansion behind the double-deck dais, and a tremendous burst of applause followed from all tables in the ballroom when the band struck up "Dixie." The widespread geographic origins of the guests were made evident by the applause that followed, in each case from a different set of tables, when the band that participated in the festivities played a succession of songs popularly identified with specific states and regions.

A diamond ring bearing the IA emblem was presented to Secretary Raoul on behalf of the Local Unions comprising the 10th District.

IA President Richard F. Walsh; J. C. McDowell, secretary of New York Local 1; Thomas Murtha, business representative, Brooklyn Local 4; and William Collins, AF of L regional director, were among the principal speakers. The speakers stressed Raoul's services in improving wages and conditions of employment and in promoting teamwork among Locals of all areas. Secretary Raoul, in turn, emphasized the cooperation that Locals had extended to him in his work and stressed his philosophy that a labor leader should be "always the servant . . . of those he represents."

Murtha was toastmaster and chairman of the arrangements committee. Among the industry leaders seated on the dais were Maj. L. E. Thompson of RKO; Joseph Vogel, Loew's, Inc.; Frank Phelps, Warner Bros.; Gen. Lyman Munson, NBC; Russell V. Downing, Radio City Music Hall; Martin T. Lacey, president and James C. Quinn, secretary-treasurer, Central Trades and Labor Council of Greater New York.

Also seated on the dais and representing IA Locals from all parts of the country were, among others, Albert F. Ryde, L. 233, Buffalo, N. Y.; Don Rood, L. 128, Utica, N. Y.; IA Rep. John Francavilla, L. 702, New York City; IA Rep. Eddie Miller, L. 279, Houston, Tex.; IA Trustees William C. Scanlan, L. 73, Lynn, Mass., R. E. Morris, L. 142, Mobile, Ala., and George W. Brayfield, L. 230, Denver, Colo.

General Secretary-Treasurer William P. Raoul (center) being congratulated by IA President Richard F. Walsh (right) and Toastmaster Thomas Murtha (left) at the recent 10th District testimonial dinner given in his honor.

Virtually all top IA executives were present, including Harland Holmden, L. 160, Cleveland, Ohio; James J. Brennan, L. 1, New York City; Roger M. Kennedy, L. 199, Detroit, Mich.; Felix D. Snow, L. 31, Kansas City, Mo.; Carl G. Cooper, L. 33, Los Angeles; Harry Abbott, L. 307, Philadelphia; Orin M. Jacobson, L. 175, Tacoma, Wash.; John Spearing, L. 511, Jacksonville, Fla.; Maynard Baird, L. 405, Knoxville, Tenn., and Larry Katz, L. 488, Harrisburg, Penna. Rev. Joseph Kelly, of St. Peters College, N. J., pronounced the invocation.

• Applications are now being received by the Committee on Education of the Massachusetts Federation of Labor for two fellowships, which include a 13-week course at Harvard University, Cambridge, Mass. The course will begin September 1952 and will include, among other subjects, a history of the American labor movement, problems in labor relations, arbitration and conciliation, pension plans, negotiation and wage incentives. No specific education qualifications are required and applications will be received until June 30.

• Ken Caldwell, member of Buffalo Local 233 and projectionist at Dipson's Bailey Theatre, announced the debut several weeks ago of the Caldwell Halo Screen. Theatre audiences responded favorably to the new screen, reports Caldwell, and he is very optimistic about its reception throughout the country.

• The AF of L's Union Industries Show will hold its 1952 exposition at Mechanics Hall, Boston, Mass., May 17-24. This is the seventh show in a series which began in Cincinnati in 1938. It is expected that every AF of L craft will be represented in this exposition, which is designed to encourage better relations between AF of L unions and their respective employer firms.

• Los Angeles Local 150 recently signed 5-year pacts with Fox West Coast, Warner Brothers, RKO, United Artists, and Paramount. The contracts call for a sliding scale of increases beginning with a 12c per hour increase, retroactive to July 1, 1951 and running to June 30, 1952; from July 1, 1952 to June 30, 1954,

Guest of honor at the recent 10th District testimonial dinner, IA General Secretary-Treasurer William P. Raoul (seated, second from left), is shown here with executive board members of the District. Seated, left to right: Albert F. Ryde, bus. rep. L. 233, Buffalo; Raoul; Thomas Murtha, bus. rep. L. 4, Brooklyn; J. C. McDowell, sec. L. 1, New York City. Standing, left to right: H. Paul Shay, L. 289, Elmira, and 10th District sec.; Donald R. Rood, L. 128, Utica; M. J. Mungoven, bus. rep. L. 25, Rochester; IA Rep. John J. Francavilla, L. 702, New York City. 10th District executive board member Nathan Storch, L. 366, Westchester County, was unable to attend the dinner because of illness.

each man will receive an additional 15c per hour increase; and from July 1, 1954 to June 30, 1956, another 12c per hour increase will become effective. In addition to the wage increases, the new contracts include new benefits in the vacation clause. Negotiations with the drive-in theatres and the independents are still pending.

• Detroit Local 199 lost one of its 40-year members in the death last month of Charles Barnett, 58, projectionist at the Broadway-Capitol Theatre. Barnett succumbed to a heart attack, a disease which has become the number one killer in our country today.

• Among the many recent out-of-town visitors to the offices of IP were: Eddie Miller, business representative, and "Bumps" Googler, Local 279, Houston, Tex.; William B. Keeler, business representative, and John Dennis, L. 407, San Antonio, Tex.; Harvey D. Hill, Sr., business representative, Local 249, Dallas, Tex.; Pat Travers, L. 173, Toronto, Ont.

• Local 586, Columbus, Norfolk, Grand Island, Hastings, and York, Nebr., held a Silver Jubilee dinner party last month in celebration of its 25th anniversary. In addition to the members, a number of top-ranking IA officials attended the party. IA President Richard F. Walsh and Leo Tews, business representative of Local 586, were presented with traveling clocks. Tews, incidentally, is the only remaining charter member of the Local. Gifts of cuff links and tie clasps were presented to Roy Brewer, former president of Local 586 and now IA West Coast representative, and to Felix D. Snow, IA 5th vice-president.

• Employes of the Allen B. Dumont Laboratories (N. Y.; N. J.; Conn.; Penna.; D.C.) engaged in the storing of motion picture film unanimously elected New York Motion Picture Film Editors Local 771, IATSE, as their bargaining agent. This election was certified by the NLRB.

• Chester Demaree, business representative for Local 163, Louisville, Ky., reports the signing of new contracts with the drive-in theatres in the Local's jurisdiction, giving the projectionists an increase of $10 per week. This increase, which is subject to the approval of the Wage Stabilization Board, is retroactive to January first last.

• Members of Chicago Local 110 earned over $50,000 last year operating 16-mm equipment in and around the Chicago area, revealed Clarence Jalas, secretary of the Local. Officials of Local 110 began taking an active interest in the matter of 16-mm showings several years ago, when it became evident that renters of such equipment in the Windy City failed to hire union members to operate it, as they had promised to do. This situation was remedied, however, when Gene Atkinson, business representative of 110, and Jalas took an active interest in the matter, and for the past few years the 16-mm showings have been the work of 110's members. These showings are mostly at hotels, in connection with sales meetings and other conventions.

• In his April 25th column for *The Unionist*, the official organ of the Nebraska State Federation of Labor, Clyde Cooley, secretary of IA Local 343, Omaha, Nebr., pays tribute to the heroic efforts of the people living in flood-threatened Council Bluffs and nearby towns in trying to save their homes and the homes of their neighbors from the ravages of the rampant Missouri River. All theatres in the threatened areas closed and the employes joined the thousands of others whose chief concern was to reinforce the flood walls and to prevent further damage. Although the press throughout the nation mentioned the wonderful work done by the civilian flood workers, very little was said about the magnificent efforts of organized labor in the Missouri Valley flood area in helping to alleviate the sufferings of the stricken people.

Mayor Mulqueen, of Council Bluffs, Iowa, voiced the praise of officials of the inundated towns and cities when he stated "I deeply appreciate the efforts of union members in this emergency. The skilled craftsmen, railroad brotherhood members, and others have helped immensely in this battle against our common enemy. I would like to express the deepest gratitude for the manner in which all of you have faced the problems and for the help which you have given."

• We were glad to learn that James V. Fensore of Local 277, Bridgeport, Conn., and projectionist at Loew's Poli Theatre, is recuperating from his recent indisposition.

• A four-day labor course at the University of Iowa, June 16-19, was recently announced by the Iowa State Federation of Labor. All labor bodies and trade organizations in the state have been invited to send representatives. The enrollment fee of $50 will cover tuition, registration, board and room for the week. Subjects to be discussed include labor history; current labor laws of state and nation; union security; trade unions' public relations; workmen's compensation; unemployment insurance, and vocational rehabilitation. There will also be a one and one-half day conference on wage stabilization and industrial safety.

Rademacher Promoted

A. J. Rademacher has been promoted to assistant operating manager of Altec Service Corp., Operating Manager E. O. Wilschke announces. Rademacher was formerly business manager of the Eastern Division. He has been associated with Altec throughout the company's existence and has won repeated promotions.

Business Is Better

Easter weekend attendance in New York picture houses was the heaviest since 1946, Metropolitan Motion Picture Theatre Association estimated.

IA President Walsh (fifth from right) and Leo Tews, bus. rep. Local 586 (extreme right), hold the traveling clocks presented to them on the occasion of the Local's recent 25th anniversary celebration. Local 586 officials gathered at the festive boards are, left to right: L. Christofferson, treas.; F. L. Kerwood, pres.; O. P. McCurdy, sgt.-at-arms; E. O. Hart, fin.-sec.; F. D. Snow, IA 5th vice-pres., Walsh; C. Krieger, sec.; W. E. Snyder, pres.; F. Driskell, member, exec. board, and Tews.

Inspection, Splicing and Care of Film

These notes are condensed from advisory comment prepared by Eastman Kodak for film exchanges; they apply just as emphatically to theatres.

INVESTIGATION of the general procedure in the inspection and repairing of prints indicates that a considerable portion of initial damage may actually occur in the exchange. Inspections are frequently too rapid to be thorough and the methods employed may easily have a direct bearing on the life of the prints. Splicing, if carelessly done, will frequently result in the films being sent to the theaters in such poor condition as to be unable to withstand ordinary projection and rapid rewinding.

Careful inspection and repairs in the exchange result in better service to the exhibitor, greatly lessening the danger of breaks in the projector. Such breaks may result in additional mutilation, a frequent source of considerable controversy between the theater and the exchange. Any steps which can be taken to eliminate these breaks will reduce replacements and make the film constantly available for service. Longer commercial life means increased earning capacity.

Inspection Methods

Methods of inspection vary in different exchanges. Some inspectors hold the hand below the film (the specified method in some instances), so that the film runs between the thumb and finger, usually through a cloth, cotton glove or in some instances cleansing tissues, to feel for bad splices and cut edges. This is illustrated in Figure 1 and is considered to be the approved method.

In many instances, however, inspectors may hold the film in the closed hand from above, applying pressure with one or more fingers to the underside of the film in order to obtain sufficient tension for snug winding, then upward between the thumb and forefinger for edge checking, as shown in Figure 2. This method permits rubbing of the complete surface of the film, resulting in a considerable amount of emulsion abrasion, particularly if the cloth or glove through which the film is drawn is badly soiled. Cloths used for this purpose are frequently in this condition because they are often used for the purpose of removing oil and dirt from the film. If the cloth is not changed frequently it may soon accumulate enough dirt particles to cause abrasion. Another objection to holding the film in this manner is that it often allows the film to rub directly against the metal top of the work bench, and any such contact should, of course, be avoided.

FIG. 2. Non-recommended method of holding and guiding film during inspection. Use of this method may result in excessive abrasion and, possibly, under dry air conditions, in center splitting or edge breakage (see Fig. 3).

FIG. 1. Recommended method of holding and guiding film during inspection.

Center Splitting

If inspection is carried out as shown in Figure 2 then the edges of the film are usually forced downward by the pressure of the thumb and finger. Because of this, the film often develops a running kink which may cause cracking or splitting, especially in old prints which have had repeated projection or in prints which have dried out due to storage at low relative humidity. These center breaks (Figure 3) may occur even with newer films under cold, dry, winter conditions if the film is bent or cupped too severely during winding. Occasionally it is found that inspectors tape the fingers of the glove. This practice is undesirable because the tape prevents the operator from ascertaining how much pressure is being applied to the film and reduces his or her sensitivity to faults.

For better screen quality, all prints should be properly cleaned when they become dirty or badly oiled, but this should be done by approved methods only. In many cases, prints are run through a dry cloth to remove dirt and oil. This is likely to result in scratching the film owing to accumulation of dirt particles on the cloth, and most of the oil is merely spread over the film rather than removed. This practice is undesirable, particularly with new prints, which are more easily scratched than films which have been run.

Cleaning can best be done by laboratory cleaning machines, with which proper techniques and precautions can be observed.

When prints must be cleaned by hand, this may be done by rewinding the film slowly through a lint-free rayon plush, or a soft cotton cloth pad which has been moistened with film cleaning fluid. The pad can be folded over the film and held in the left hand while the right hand is used to operate the rewind. The operation should be carried out slowly so that the cleaning liquid can evaporate from the film before it is wound into the roll. The pad surface must be changed frequently since a dirty pad will redeposit oil and dirt and may abrade the film.

Cleansing Fluids

The film cleaners used are generally carbon tetrachloride* or dry cleaning solvents. Carbon tetrachloride is highly toxic, while the less toxic dry cleaning solvents are inflammable, so that both must be used with caution. Ample ventilation with fresh air is essential and one should carefully avoid inhaling the fumes of carbon tetrachloride.

The cloth used for cleaning must be selected carefully. Baled rags usually contain many harsh cloths that will scratch and abrade the film and may also contain a great deal of lint. Best of all is a clean, short-nap rayon plush or velvet. Next best is a soft cotton knit fabric, plush, or a soft well-washed cloth.

Poor Rewinding

In rewinding, care should be taken to see that the winding equipment is properly lined up so that the film will feed smoothly and squarely from one reel to the other. In this manner a smooth roll is wound with no protruding edges.

In order to obtain smoothly wound rolls, many inspectors bind one edge of the film against the reel flange during the winding operation as shown in Figure 4. As a matter of fact, rewinds are often deliberately set out of line to give even winding by this method. Moreover, exchange reels are so frequently sprung out of shape, as illustrated in Figure 5, that even winding is almost impossible unless flange binding is employed. This practice is especially bad if there is a sharp point in the rim of the reel (often caused from the jaws of pliers used to remove a reel of film from a tight case). Such sharp point may cut the edge of the film on each turn of the roll. It is not at all uncommon to have only one-half-inch spacing where the flanges of a two-thousand-foot reel are snapped together, or a spacing almost double the width of the film where the flanges are sprung apart. Under these conditions it is essential that the film be guided in some manner during rewinding in order to avoid turns or convolutions with protruding edges. These exposed edges are easily bent over and broken during handling or shipment, as shown in Figure 6, or if the rolls are forced into a shipping case which has become badly dished, such as the one shown in Figure 7.

If the exchange finds it necessary to use defective reels and cases until such time as replacements are received, every effort

FIG. 3. Center break caused by excessive bending or cupping of film during inspection by the non-recommended method shown in Fig. 2.

FIG. 4. Illustrating practice of edge binding print against flange during rewinding to obtain an evenly wound reel of film.

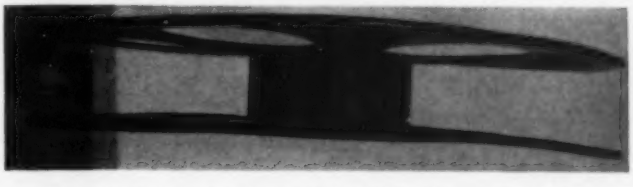


FIG. 5. A badly distorted exchange reel, the kind that damages or ruins film.

* **WARNING!** Carbon tetrachloride fumes are poisonous; headache and nausea are a first warning, and continued exposure may be fatal. Evaporation of only two teaspoonfuls of carbon tetrachloride into a small unventilated film inspection room is enough to raise the concentration of fumes beyond the safe level. Carbon tetrachloride is dangerous whenever the odor becomes strong enough to be obvious. Ventilation must be good so that a person just entering the room where carbon tetrachloride is being used can barely smell the fumes. If the fumes become stronger, all windows should be opened, the cleaning stopped, and the room emptied until it has been thoroughly ventilated.

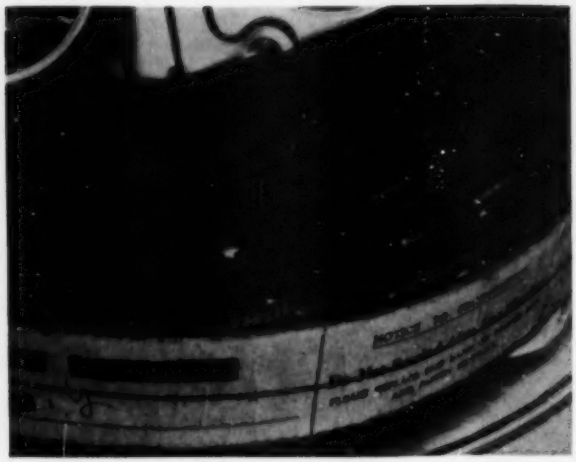


FIG. 6. Showing how unevenly wound film may be damaged either during shipment or through being forced into a "dished" case such as is shown in Figure 7.

should be made to restore them to a reasonably usable condition.

Notching Is Harmful

It is common practice to notch the edges of the film when small side nicks or breaks do not warrant immediate splicing. On the subsequent examination however, these notches frequently develop into long tears when caught by the glove or cloth, often resulting in a noticeable break in continuity. Film breaks during projection may also occur in some cases as a result of edge notching. This practice of edge notching is definitely and seriously harmful.

Leaders and Trailers

Protective leader and trailer strips should be kept at full length. Motor winding speeds are frequently so high as to cause the end of the film to whip around (on the projector take-up as well as on a motor-driven rewind) a number of times before the roll is stopped. This can be responsible for considerable loss in footage if the protective leaders or trailers are allowed to become too short.

New Print Mounting

It is important to note that the emulsion surface of newly processed film is more susceptible to abrasion than film which has seen service. Therefore, in mounting new prints just received from the laboratory, care should be taken to avoid contact with the picture area even though cotton gloves or a cloth might be used.

New film should not require cleaning but if it is found necessary to remove lint or dust particles such as might come from the tissue wrappings or cardboard separators, silk plush, slightly dampened with carbon tetrachloride or other film cleaning liquid, should be held very lightly against the film as it is wound. The plush pad surface should be changed frequently and the surface of the film should be checked often for any abrasions which might result from this "dusting" process. Winding should be carried out very slowly to permit complete evaporation of the solvent, otherwise the latter may cause spotting of the film if it is wound into the roll.

If carbon tetrachloride is used the precautions previously noted should be observed in order to prevent toxic effects resulting from undue exposure to the fumes from this chemical.

"Bicycling" Prints

In locations where a shortage of prints exists it is often necessary to circuit them directly from one theater to another. In such cases, release prints frequently suffer considerable damage. There are recorded instances of some prints being exhibited by six or eight theaters before they are returned to the exchange for examination and repair. During this process the print does not have the benefit of exchange inspection and repair.

It is quite possible that some types of damage which occurred during projection or handling by the first few theaters might have been arrested. Instead, further footage is affected. The total damage greatly increased. Circuiting also makes it impossible to identify the theater responsible for the damage in the event that compensation is sought by the exchange.

Splicing

Splicing, whether done in the film laboratories, film exchanges or theaters, has such a direct bearing on the life of film as to call for special and constant attention.

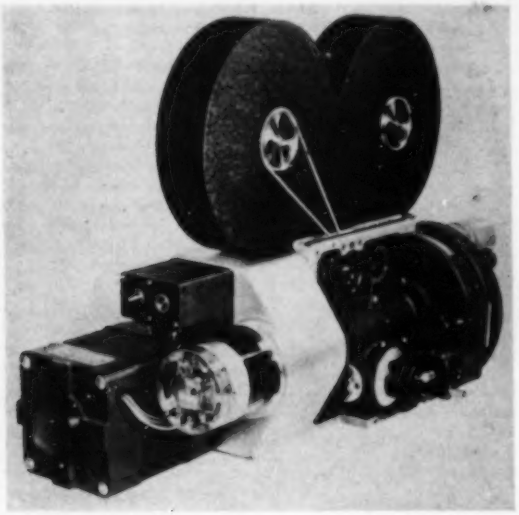
Much film is ruined by poor splicing. Splices that are wide, stiff, buckled or out of line might cause the film to jump the sprockets so that torn perforations or breaks result. Perforations in the vicinity of a splice of this kind are always strained or broken.

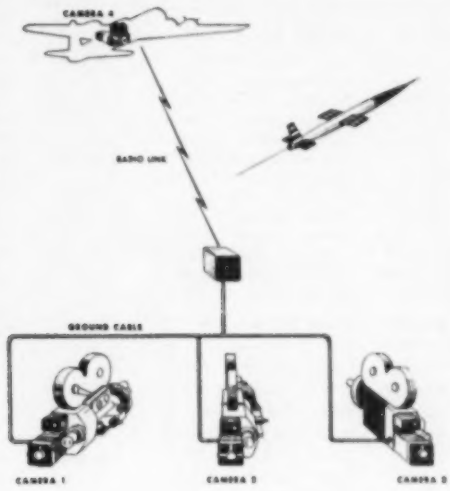
[TO BE CONTINUED]

FIGURE 7

"Dished" or badly bent case. Such cases should be repaired or discarded to prevent damage to film.

NEW MAURER SERVO-SYNC CAMERA DRIVE HOLDS PROMISE FOR THREE-DIMENSIONAL STUDIES





A new system for synchronized motion picture camera operation, providing greatly closer time synchronization than heretofore possible, is announced by J. A. Maurer, Inc., Long Island City, N. Y.

The system, known as the Maurer Servo-Sync Camera Drive System, was designed by Origins, Inc., Saybrook, Conn., and is manufactured by Maurer. It is designed to achieve a long-sought goal in scientific photography—dependable, consistent, and accurate operation of a series of motion picture cameras taking their pictures at the same time to close tolerance. Maximum possible deviation of shutter position in this system, which utilizes circular rotating camera shutters, is less than one degree (1°), which at 12 frames per second is equivalent to an accuracy of 23 microseconds. (A microsecond is one-millionth of a second.)

Pulse-Operated Deficiencies Overcome

As frame frequency increases, the angular accuracy remains essentially unchanged, while the time accuracy decreases. For example, at 50 frames per sec, the angular deviation is still approximately 1° and the time accuracy has increased to a maximum deviation of 35 microseconds. Due to the nature of the continuously-rotating system, failures common to pulse-operated systems are eliminated.

The Servo-Sync camera drive system has been applied to a 35-mm camera of standard manufacture which uses interchangeable magazines having capacities of 400 and 1000 feet of film. The system is not limited to one camera type but is equally applicable for use with a large number of motion picture, scientific, and ribbon-frame cameras, and motion picture and process projectors.

The 35-mm camera system was developed for Wollensack Optical Co.

This system will be utilized for data recording flight testing, missile tracking, ordnance evaluation, and most applications where two or more sources of information must be recorded simultaneously.

There is no practical limit to the number of cameras (projectors) that may be synchronized by this method. An interesting use lies in three-dimensional studies where two geometrically-oriented cameras are required for simultaneous recording. The system also has application in professional and television motion picture production where extremely close time synchronization of a number of cameras, projectors, or sound-recording apparatus is required.

Month Sees Phenomenal Increase in IA-IP Radio Ham List

By AMOS KANAGA, W6BAA
Sec., Local 419, San Mateo, Calif.

THIS month shows a phenomenal increase in our list of IA radio amateurs. We have quite a few to thank for this but top honors should go to W6MU, A. Houston Barnett, L. 695, Los Angeles, who is also a Gold Award "Worked 25 IA-IP" winner. To date it looks as if Local 695 has the largest number of radio amateurs on its rostrum with Local 150 (also in the Los Angeles area) running a close second.

Other contributors to our list were award winners W6PFF, Frank Champlin, L. 150; W1BVB, Don Fancher, L. 439, New London, Conn.; W6FOP, George Abrams, L. 297, San Diego, Calif.; and VE7ALW, Merle Wilson, L. 348, Vancouver, B. C. Our first "Worked 10 IA-IP" winner W4PKT, Marion Sanders, L. 507, Macon, Ga., is still in there plugging for the 25 achievement award.

A salute to IA President Walsh and to IP for their splendid cooperation in making these Achievement Awards possible.

QST ran an item on our lists available to IA men and, Brother, did we run out of them fast! Our good friends at IP kicked through with a pile of extra copies of IP to help fill in the gap—but for this time only. We cannot continue to impose on them so fellows *please* get your subscription in to them or send word to me. You sure did all right on those subs this month, so let's keep the good work up—and in fact try to do even better as we go along.

Looking over the list, we note that some districts are not too well represented. So if any of you fellows in the W3, 4, 5, 8, 9, and ϕ districts know of someone we missed, shoot in his call and IA Local number. These are heavy IA districts and they should make a much better showing.

You gang are keeping us up late checking over your logs for IA-IP awards, but this is FB by us. In fact we are surprised that some of you who have made the "worked 10" award have already shot in your additional 15 or more contacts to qualify for the Gold award. Yes, a man can win both. Be sure to remember when sending copies of

IA-IP 'HAM' LIST

CALL	NAME and LOCAL
W1ADM	Carl Scheffy—L. 334
W1BCE	C. J. Crowley—L. 459
W1EBO	Woodrow Guile—L. 459
W1LW	Norman Soules—L. 459
W1NZE	Arthur Madsen—L. 182
W1BHJ	Otto Halquist—L. 182
W1WI	Tom McNamara—L. 505
W1BVB	Don Fancher—L. 439
W1IYY	Harold Wyman—L. 96
W1JBU	George Gravell—L. 96
W1BTW	J. Roland Lizotte—L. 546
W1JWN	Theodore Kahn—L. 86
W1KKJ	Howard Bruya—L. 505
W2TSN	Victor Bufis—L. 365
W2WZX	Erich Pattky—L. 344
W2CYQ	Frank Larham—L. 108
W2ARP	Fred Ramhorst—L. 534
W2NFU	Sydney Trisch—L. 306
W2RUA	Hugh Newcomb—L. 462
W2QYQ	Alfred Beckett—L. 462
W2VSQ	Frank Tamborel—L. 306
W2OCL	Edward Ricca—L. 306
W2MYJ	Mike Revzin—L. 306
W2ORS	Charles Roop—L. 418
W2DZA	Alex Knight—L. 353
W2AOM	Jack Garritson—L. 306
W2NAJ	Peter Hurgon—L. 306
W2AMB	Fred Huff—L. 306
W2ZCE	John V. Richards—L. 1
W2RQZ	Frank Lipinske—L. 337
W2HRJ	Charles Beckett—L. 462
W2BOR	William Axton—L. 534
W2HWF	Albert Districht—L. 306
W2BDK	Lloyd Matteson—L. 290
W2PVB	Kenneth H. Allfrey—L. 290
W2HP	Jack North—L. 640
W3KNY	Harris Good—L. 661
W3MEY	Leo Foran—L. 335
W3BBV	Nelson Stover—L. 283
W3JMA	Ralph Rushworth—L. 181
W3PMY	John Nordine—L. 296
W3MHE	Charles Gibson—L. 444
W3BJ	Al Edwards—L. 307
W3RXT	Bernard Rask—L. 171
W3TVM	Harry Drew—L. 171
W4BWN	Bob Cobble—L. 405
W4HJC	Arlie Bellflower—L. 225
W4MCT	Jim Davis—L. 552
W4NOM	Buddy Rogers—L. 225
W4PKT	M. H. Sanders—L. 507
W4CIU	Bill Britton—L. 537
W4FGG	Marvin Storler—L. 144
W4RFF	Howard Ross—L. 574
W4RMT	E. M. Karcher—L. 482
W4KBJ	James File—L. 290
W4MEP	J. Wyatt—L. 793
W4FGK	D. Holye Knight—L. 412
W4DPT	Adrian McCroskey—L. 446
W4SMR	Roy J. Allison—L. 623
W4AUS	Charles M. Moore—L. 568
W4AEI	Austin S. Baumann—L. 507
W4EHC	Roland E. Coffee—L. 808
W4HRR	Joseph R. Good—L. 518
W4IU	Rupert E. Carter—L. 225
W5MPG	Rex Parker—L. 204
W5IIP	Pat Talbot—L. 249
W5DYV	Paul Belian—L. 604
W5CQ	Ray J. Morrow—L. 597
W5CQQ	Rajmunt J. Machu—L. 597
W5IMT	A. S. Johnstone—L. 293
W5OQJ	Norman Olstad—L. 279
W5ODA	William Couse—L. 450
W6BAA	Amos Kanaga—L. 409
W6UZA	Malcomb Keele—L. 150
W6DPU	Roy Brann—L. 150
W6PFF	Frank Champlin—L. 150
W6PQS	Joe Wilson—L. 504
W6ALO	Tom Jentges—L. 504
W6GTP	E. Schwartz—L. 695
W6MTO	Leroy Wardel—L. 762
W6DYJ	Ed Pothier—L. 215
W6IV	Delos Trim—L. 297
W6PB	Dan O'Brien—L. 159
W6RKB	Bob Gillespie—L. 241
W6YWC	Lewis Howard—L. 162
W6EFL	A. H. Whitney—L. 150
W6EAQ	E. L. Kline—L. 150
W6CAG	August De Grazia—L. 150
W6CYW	Frank Hemerlein—L. 150
W6KNI	Cliff Schwander—L. 150
W6REH	Harry Gould—L. 150
W6BPT	Roy Pinkham—L. 431
W6FBW	Elbert Amarantes—L. 431
W6WPG	Robert Hyde—L. 796
W6IDY	Dom Lucido—L. 241
W6EP	Leslie Hewitt—L. 695
W6HK	Frank Creswell—L. 728
W6YDU	C. B. Putnam—L. 490
W6BWI	Harry Morse—L. 297
W6VTX	Ralph Addy—L. 521
W6EIR	Leroy Ward—L. 521
W6ZOK	Max Miller—L. 521
W6FGV	Norman Owens—L. 521
W6BEP	C. C. Applegate—L. 187
W6WPG	Robert Hyde—L. 796
W6ZEN	Floyd McPherson—L. 709
W6FOP	George Abrams—L. 297
W6AGN	Arthur Hansen—L. 297
W6EWU	Tom Wells—L. 297
W6YBC	Hansen Cressap—L. 297
W6ZBX	George Kaiser—L. 297
W6CZK	Ray Baumann—L. 434
W6CML	Tom Moore—L. 169
W6IYT	L. H. King—L. 796
K6CH	H. H. Quackenbush—L. 510
W6GCF	Charles Busby—L. 599
W6HUE	Homer Elias—L. 599
W6UVO	Edward Ives—L. 150
W6WER	Clarence Woerth—L. 150
W6RN	Lynn Bradshaw—L. 162
W6PB	Dan O'Brien—L. 159
W6MJ	Edwin T. Luckey—L. 776
W6FHQ	"Barney" Harris—L. 614
W6YIY	Victor Eiserbraun—L. 150
W6FTF	Ellis Phippen—L. 150
W6GWS	David S. Horskey—L. 659
W6RWT	Charles Tucker—L. 368
W6KQW	Robert McKinley—L. 297
W6EUW	Anthony Bayer—L. 504
W6MU	A. Houston Barnett—L. 695
W6BQR	Joel F. Moss—L. 695
W6KYL	J. A. Goodrich—L. 695
W6TL	C. A. Riggs—L. 695
W6FKZ	Roy Raguse—L. 695
W6LJY	A. Kenneth Tatum—L. 695
W6EJH	Jack Lilly—L. 695
W6DDQ	Phillip Wisdom—L. 695
W6CJ	Perry Stilley—L. 695
W6HLK	Charles Noyes—L. 695
W6OL	Frank Maher—L. 695
W6TY	Gene P. Merritt—L. 695
W6WY	Howard Fogetti—L. 695
W6YW	Art Dixon—L. 695
W6AOR	Francis Sarver—L. 695
W6JC	Victor Presbrey—L. 695
W6DP	William Snyder—L. 695
W6GFI	Roy Meadows—L. 695
W6UZW	Glenn Porter—L. 695
W6BWF	James Miller—L. 695
W6TVN	Edwin Van Gundy—L. 695
W6KP	Oliver Garretson—L. 695
W6RP	S. Lambert—L. 695
W6LJW	George Hammer—L. 695
W6HXX	Gordon Sawyer—L. 695
W6WQ	Charles Slyfield—L. 695
W6MBD	Harry Leonard—L. 695
W6HI	Harold Bumbaugh—L. 695
W6TS	Edward Willis—L. 695
W6VL	Tom Lambert—L. 695
W6QJ	Charles Hisserich—L. 695
W6IZ	Edmund Hansen—L. 695
W6SWM	Charles Cohn—L. 695
W6WV	Robert Cook—L. 695
W6RW	Roger Mace—L. 695
W6LGU	Alfred Cline—L. 659
W6SIM	Everett Douglas—L. 776
W6KVI	Wilbur Johnson—L. 776

your logs that ANY postwar QSO counts and that all that is needed is the contact's call, his Local number, and dates worked. QSL cards are not necessary.

We lost a wonderful friend in the sad passing of Brother Harry Sherman. Those of you who have expressed your heartfelt sympathy, and that group who when told about it over the air during their midnite chat held a minute of radio silence out of respect to his passing, speak eloquently on his behalf. He will be missed.

73.

Official IA-IP calling frequencies:

3950	14,250
7250	28,700

A. Houston Barnett, W6MU, member of Sound Technicians Local 695, Hollywood, has been a ham since 1919. Barnett is a sound recorder at Paramount studios; a member of the SMPTE and IRE; and a winner of one of the first "Worked 25 IA-IP" gold awards.

(*Continued on Page* 29)

SMPTE CONVENTION

(*Continued from Page 15*)

some Convention registrants to difficulties of projection that had never previously suggested themselves even during long years of experience:

. . . under the stars, with high ambient noise level. When, as in destroyers, a propeller shaft is directly beneath the point where the projector is set up the open air 'booth' has a vibrating platform. . . . The screen flaps like a sail, but if "the ship is traveling by itself, with no particular time schedule for arriving at any one particular port, or where a ship can make up lost time, the Commanding Officer will normally slow . . . down . . . or even change course for the duration of the show. This permits a properly lashed down screen to remain in place without too much flapping."

Since projection takes place outdoors and at sea a bright moon tends to dim down the picture.

Aboard larger vessels, such as battleships or cruisers, an inside location may be available, but "the high ambient noise still governs and projection conditions are extreme with regard to securing satisfactory sound distribution. . . . Cross winds, engine room blower noises, noise of the ship underway—all act to hinder the intelligibility of sound to a maximum extent."

As the speaker paused in his presentation an unidentified registrant was heard to say somewhat loudly: "And still some of us think we have troubles!"

Magnetic Records

In the Drake Hotel, but outside the Convention Hall, RCA demonstrated a new magnetic recording system while at the Convention itself representatives of Bell and Howell Co. and DeVry Corp. demonstrated and described their own latest developments in magnetic tracks. Papers and subsequent discussions aboundantly brought out the need for standardization in magnetic soundtrack practices; a problem the Society has taken under advisement.

Particularly stressed in the discussions was the complication introduced by current use of half-width and full-width magnetic tracks in 16-mm. The latter cover the entire track area, but the former is only half the usual soundtrack width with the remaining area occupied by a half-width optical track. Thus there are two tracks, one optical and one magnetic, on a single film; an arrangement that possesses some obvious advantages for export. However, when such half-width magnetic tracks are played back through a full-width magnetic reproducer the reproducer suffers wear on one side only and quickly becomes useless. (The iron oxide of the magnetic

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soundtracks is an excellent abrasive—"rouge" used for polishing optical glass, as in grinding lenses, is also an iron oxide.)

The demonstrated RCA magnetic recorder-reproducer is designed to produce magnetic records for motion pictures, TV or other purposes at exceptionally low cost. It uses half-width film, 17½-mm. The film runs at half normal speed, or 45 feet per minute; however, the resolution achieved permits subsequent transcription to a normal track with acceptable high frequency response. A variation of the same equipment uses 16-mm stock at 36 feet per minute. Reduction in apparatus cost, film cost and film storage space are the objectives of the new design.

Bell and Howell Co. presented a 16-mm projector designed to reproduce both optical and magnetic soundtracks, and containing in addition facilities for recording and erasing magnetic sound. It can reproduce sound which it has itself recorded. Designated the Bell & Howell 202 Projector, the mechanism is described as essentially a conventional B. & H. model to which magnetic track facilities have been added. A relay which opens automatically at any interruption of forward running of the film, and cannot be re-closed except by manual intervention of the operator, minimizes the chance of accidental erasure of magnetically-recorded material.

E. W. D'Arcy for DeVry Corp. described and demonstrated both the methods used to apply magnetic sound to existing 16-mm equipment currently in the hands of the Armed Forces, and also combinations of magnetic narrative soundtrack with optical background or effects soundtrack. Engineers can be competitors who are respectful toward each other's achievements and D'Arcy was publicly complimented on the quality of his sound by Bell & Howell's M. G. Townsley.

For Better Take-Up

An automatic torque controller for torque motors used for film take-up was presented in principle by Carl E. Hittle of RCA. Its essential elements are a pivoted arm riding on the film being rolled up and rotating through an arc as the amount of film on the reel increases; a multiple-step rotary switch actuated, step by step, as the arm pivots; and a set of resistors which are connected to both the switch contacts and the motor and thus control the torque of the motor as they are switched into or out of service by the growing diameter of the film roll. As the size of the roll increases so, proportionately, does the motor torque. Film tension can be maintained constant within 2 ounces of an 11-ounce standard, as compared with friction clutch or uncontrolled torque motor deviations of 600 percent under comparable conditions, it is claimed.

Only 50% Correct Focus

A large number of registrants remained to the end to hear the paper with which William Borberg of General Precision Laboratory closed the Convention—a discussion on "Buckle Reduction in 35-mm Film" in which the speaker disclosed that a typical motion picture is out of focus 50 percent of the time it is on the screen and "This is the best the projectionist can do."

The type of buckle referred to is a temporary, not permanent, deformation of the film while it is in the aperture. The deformation is caused by the fact that the film is partially opaque and therefore absorbs light energy; this energy, being absorbed, can no longer manifest itself as light, but only as heat. Film is composed of two elements, base and emulsion; the heat resulting from absorption of light causes the film to act like a bimetallic structure and buckle, or bulge. The emulsion, being more opaque than the base, absorbs more energy, and thus forms the convex side

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Even major overhauls of projector mechanisms, intermittent movements and arc supply MG sets are provided under the RCA COMPREHENSIVE PARTS and REPAIR PLAN. In such cases the Plan covers all costs of factory or repair shop labor in addition to cost of parts. It also provides for loaner units without charge and for all shipping charges both ways.

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of the bulged film. "The magnitude of the deformation . . . is more than sufficient to affect the sharpness of image focus.

"The emulsion side of 35-mm film is toward the light source; and hence the film tends to move toward the light, away from the lens, while it is in the aperture.

"In accordance with accepted terminology, the deformation is called *negative* when the emulsion side is convex and conversely, *positive* when the emulsion side is concave. (A condition that may be encountered in cold film). Flat film is considered to have *zero* deformation.

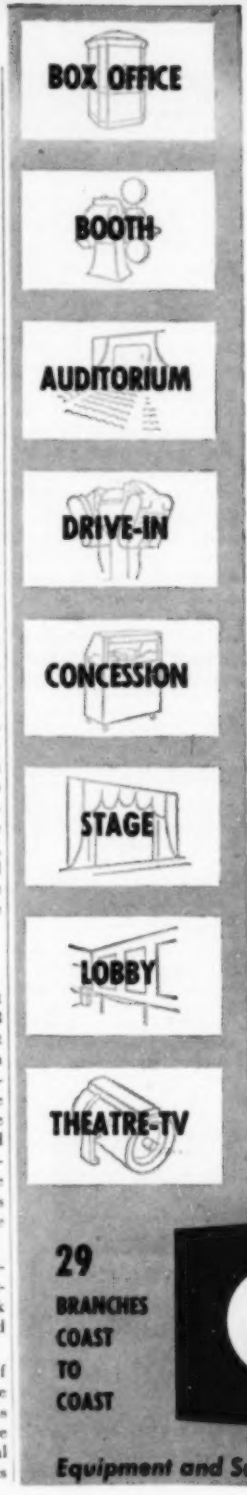
"Instantly upon registration of the film frame with the aperture the shutter uncovers the light for the first exposure of the cycle. . . . The expanding emulsion causes the exposed portion of the film frame to move from its initial zero or positive position . . . to a negative position. The film in the gate takes a somewhat spherical shape. There is a constantly increasing deformation during the first exposure, and a constantly changing distance of the emulsion surface with respect to the lens. Upon interception of the light by the flicker blade, further movement of the film surface towards the light source comes to a halt. . . . Instead, there is a loss of heat which causes the film to recede slightly toward the zero plane. At the start of the second exposure, the film surface stands somewhere between zero and its former maximum negative position. During the second exposure the film continues its excursion negatively, first rapidly, then leveling off. At the end of this exposure the film reaches a more negative position than at the end of the first exposure . . .

Projectionist Is Handicapped

"The projectionist, whose eye cannot follow this rapid sequence of events (48 times per second) has to pick a 'best average focus' position of the projection lens. . . . For the conditions demonstrated . . . good optical performance is attained during only about 40% of the first exposure and 60% of the second exposure, or a total of only 50% during a complete frame cycle. This is the best the projectionist can do. The figures . . . demonstrate the magnitude of the effect with which we are concerned."

After describing the laboratory equipment through which this effect was observed and measured, the speaker took up the question of correcting for it, and declared:

"The technique of air blast cooling of film, by which opposing air forces of the front and rear jets are adjusted so as to produce a force for positioning the film, was found to be at best a partial solution. . . . It is possible . . . by this



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Man in business has many ways to measure his services, and it is through these "measures" that the full worth of his service is determined.

There are some things, however, that no man can measure. Among these is *confidence* . . . Confidence in the quality of his product . . . confidence in the skill of his personnel . . . confidence in the wisdom of his counsel.

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method . . . to shift the average focus position; but the resultant force acts upon the film continuously, and therefore cannot correct for the intermittent cyclical frame deformations. . . . The center of each frame travels over a range of about 0.020 or 0.030 in. This range is not greatly reduced by application of a continuous displacing air force. . . . The air serves primarily as a cooling agent, preventing possible damage to the film in form of embossing or blistering or the formation of permanent buckle.

". . . because of the cyclical nature of the film frame deformations involved, any corrective action to neutralize the defects should be similarly cyclical. Hence, the following approach was tried:

"The air from the front jet was modulated by means of a rotary valve driven from the shutter shaft.

"The air from the rear jet was not modulated. The steady stream of air from this jet was used to force the film toward the lens, thus partly neutralizing the internal forces which tend to make the film, under the influence of light, take a deep negative buckle.

"The correcting air pulses from the front jet were timed so that the resultant forces from both front and rear jets opposed the cyclicly varying buckle forces. The motion of each film frame on the optical axis could thus be controlled.

". . . the position of the film frame can be held steady within fairly close limits . . . the excursions of the film frame surface can be confined to the depth-of-focus range of the lens. Good optical performance is thus obtained over the entire frame cycle . . . there is marked improvement in screen image definition."

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OTHER CONVENTION PAPERS

Following are brief accounts of some of the other papers presented at the Convention:

DUAL THEATRE TELEVISION SYSTEM

Victor Trad and Ricardo Muniz
Trad TV Corp., Asbury Park, N. J.

A new instantaneous dual theatre projection television system of the Schmidt type was described. A simple control box providing almost instantaneous changeover, in the event of breakdown, and mechanical arrangements facilitating ease of installation and maintenance were discussed.

INSTALLING GPL VIDEO FILM IN DENVER'S BROADWAY THEATRE

John M. Sims
General Precision Lab., Pleasantville, N. Y.

An account of the commercial and technical phases of a typical Video-film installation. Public relations, local ordinances, utilities and other complications were described.

NOMENCLATURE FOR MOTION PICTURES AND TV

W. H. Offenhauser, Jr.
New Canaan, Conn.

Major differences of meaning are encountered in the specialized language of motion pictures and television; efforts to eliminate the technical nomenclature problem must be well planned and executed if they are to succeed. Several attempts were listed and related past experience reviewed.

SIMPLIFIED PREAMPLIFIER WITH HIGH GAIN, LOW DISTORTION, AND EXCEPTIONAL DYNAMIC RANGE AND FREQUENCY RESPONSE

Chester E. Beachell
National Film Board of Canada, Ottawa, Ont.

Description of an extremely stable two-tube preamplifier which will realize gains approaching the mu of the pentode in the circuit. Hand-picking tubes is unnecessary. It is particularly useful in magnetic playback, phototube, microphone and variable reluctance phono preamplifier applications. There are only twelve components in the basic circuit, including tubes.

New Long-Throw RCA TV Tube

A new TV tube designed for theatre video systems requiring a projection throw of the order of 80 feet has been announced by RCA and designated the 7WP4. It provides a video screen image measuring 15 by 20 feet.

Essential innovation of the new tube is the curvature of the tube face. This matches the curvature of a spherical mirror used for the new long throw. Previous RCA theatre TV tube—the 7NP4—had a face curvature adapted to a spherical mirror used for projection throws of the order of 60 feet. Addition of the new tube and new optics to RCA's line of equipment means that a greater variety of theatres can now be supplied with large-screen TV without internal reconstruction.

The 7WP4 is an 80,000 volt, forced-air-cooled unit, measuring approximately 19½ inches long and 7 inches greatest diameter, adapted to electrostatic focusing and magnetic deflection.

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To the Editor of IP:

With reference to your "Mr. Mitchell Compares Notes," under "Letter to the Editor" in the March 1952 issue of INTERNATIONAL PROJECTIONIST, regarding the oiling of Motiograph take-ups:

Since the advent of our AA projector, Motiograph has used a semi-hydraulic take-up which uses the same type of grease as we use in our AA intermittent movement. Any use of a lighter oil will result in oil leakage along the shaft into the lower magazine, and will also result in a very erratic action of the take-up itself. When proper lubricant is used this take-up can be adjusted to take up film on any size hub from one to five inches without any additional parts or difficulty.

On our previous Model K take-up the continued use of oil will again cause serious take-up troubles. Oil on the cork faces of the take-up will cause small warts or raised spots on the cork discs which will result in very erratic take-up action. Proper and satisfactory operation of these take-ups requires keeping oil away. The disc surfaces should be lubricated periodically (every three to six months, depending on the running time of the theatre) with just a small amount of graphite or bicycle chain lubricant brushed on the cork faces.

If oil is inadvertently used and trouble does develop, take-up should be dismantled and thoroughly washed with carbon tet or kerosene. Then reassemble take-up using a small amount of fine valve-grinding compound on the disc faces. Place an empty reel in the lower magazine, start the projector and hold the reel so that it doesn't turn. Two or three minutes of this will usually be sufficient to smooth up the surface of the cork again. Again disassemble the take-up and wash. Coat the cork surface with graphite or chain lubricant and re-assemble. Take-up can then be readjusted and will work perfectly.

My answer to this is not with the idea of becoming involved with any projectionist on the "oil or not to oil" problem, but only to place our own take-up care instructions in the hands of the country's projectionists for the mutual benefit of all concerned.

J. E. HUCKLEBERRY,
MOTIOGRAPH, INC.,

Gregg Ends World Tour

Ending a world tour, E. S. Gregg, Vice President and General Manager of Westrex Corporation, is back in his New York office after a series of visits to Westrex subsidiary companies abroad. Gregg's trip took him to Ireland, England, Italy, Indonesia, Hong Kong, the Philippine Islands and Japan.

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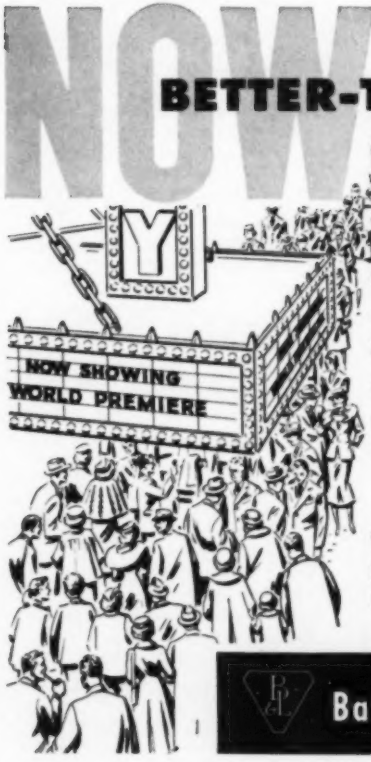

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The First "Moving Picture Machine"

This description and picture of Thomas Edison's first "Kinetoscope" were printed in *The Times* of London in 1894, reprinted from *The Times* by *Scientific American* for November 10, 1894, and recently resurrected from those historic files by *Image*, the Journal of Photography published by George Eastman House.

THIS instrument is to the eye what Edison's phonograph is to the ear. The moving and, apparently, living figures in the kinetoscope are produced in the following manner: Mr. Edison has a stage upon which the performances he reproduces are enacted. These performances are recorded by taking a series of 43 photographs in rapid succession, the time occupied in taking them being one second only. Thus every progressive phase of every single action is secured, and the photographs are successively reproduced on a film of celluloid. When this film is passed before the eye at the same rate of speed as that at which the photographs were taken, the photographically disjointed parts of a given action are united in one complete whole.

Thus supposing a person to be photographed taking off his coat—as is done in one case—the successive views representing the phase of action at every forty-third part of a second are joined up, and the complete operation of taking off the coat is presented to the eye as it would appear in reality.

The apparatus in which the reproduction takes place is a cabinet about 4 ft. high, 2 ft. wide, and 1 ft. 9 in. deep. It contains the celluloid film band, the apparatus for reconstructing the disjointed views, and a small electric motor for driving the apparatus. The chief detail of the mechanism is a flat metal ring having a slot in it, which makes about 2,000 revolutions per minute. The film passes rapidly over the ring, beneath which is a light. The spectator looks through a lens on to the film, and every action recorded on it passes under his view.

Ten machines were shown, in which the most rapid and complex actions were faithfully reproduced. One scene represents a blacksmith's shop in full operation, with three men hammering iron on an anvil, and who stop in their work to take a drink. Each drinks in turn and passes the pot of beer to the other. The smoke from the forge is seen to rise most perfectly.

In another view a Spanish dancer is shown going through her graceful evolutions, as is also Anna Belli in her serpentine dance. There is likewise a wrestling scene and a cock fight, in which feathers are seen to fly in all directions. All the features of an original stage production are given, of course on a small scale, but possibly only for the present, for Mr. Edison promises to add the phonograph to the kinetoscope and to reproduce plays. Then by amplifying the phonograph and throwing the pictures on a screen, making them life size, he will give the world a startling reproduction of human life.

TESMA Appoints John Sims

John M. Sims, theatre TV Sales Manager for General Precision Laboratory, has been appointed to membership in TESMA's Federal Legislation Committee. It is through this committee that the Theatre Equipment Supply and Manufacturers Association studies the probable effects of proposed new Federal laws on the motion picture industry, and submits appropriate reports to its members. TESMA President J. R. Hoff, who is also President of the Ballantyne Company, announced Sims' appointment.

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STANDARDS

(*Continued from Page 8*)

may be easily identified. Subtitles superimposed over each sample shall indicate the particular sound characteristic demonstrated by that portion of the film.

2.5 The length of the film shall be approximately 500 feet.

3. Method of Use

3.1 From a typical location in the auditorium the observer should determine whether or not the frequency-response characteristics of the complete reproducing system are normal by listening to the sound reproduced from the test film at normal sound level.

NOTE: A test film in accordance with this standard is available from the Motion Picture Research Council or the Society of Motion Picture Engineers.

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ARCLAMP GENERATORS

(*Continued from Page 12*)

mica, chamfer edges of bars if necessary, clean and dress.

7. ARMATURE MAKES CLICKING OR POUNDING SOUNDS

Trouble: Armature striking or rubbing against pole-pieces. *Cause:* Misadjusted or worn bearings. *Remedy:* Shim the bearings or, if loose, replace with new bearings. Check air-gap at top, bottom, and both sides with a feeler gauge to make sure the gap is uniform after work on the bearings has been completed.

8. GENERATOR FAILS TO BUILD UP VOLTAGE

Trouble: Residual magnetism of field poles lost. *Cause:* Reversal of magnetic polarity because of wrong connections when sending battery current through field windings for testing purposes. Use of alternating current for testing field windings. (Loss of magnetism sometimes occurs without apparent cause, however.) *Remedy:* Bring the carbons in one projector lamp together tightly, throw on the arc-lamp switch, then turn on the generator motor. If voltage then starts to build up, turn off the arc switch before voltage attains full value. This failing, re-establish field magnetism by connecting a 45-volt radio B battery across the generator terminals. Be very sure that the positive terminal of the battery is connected to the positive output terminal of the dynamo, and negative to negative. Break the battery circuit the moment the generator starts to build up.

Trouble: Open circuit in voltmeter or arc circuit. *Cause and Remedy:* Cause lies outside the generator, as the generator really builds up even though external defects prevent the voltmeter from registering the output voltage.

Trouble: Short or open circuit in armature or field. *Cause:* Insulation worn off or broken. *Remedy:* Repair or replace field coils, varnishing them with baking varnish (which *must* be baked) or with Glyptol, a preparation that requires no baking. Replace armature until repairs to the defective armature can be made in the shop.

9. GENERATOR POLARITY REVERSED

Trouble: Direction of rotation reversed. *Cause:* Driving motor running in wrong direction. *Remedy:* Change direction of rotation by interchanging any two of the three leads of 3-phase motors, or by interchanging the two outside *or* the two inside of the four leads of 2-phase motors.

Trouble: Residual magnetism reversed. *Cause:* DC test current sent through the field coils in the wrong direction. Very rarely, static electricity picked up by arc circuit during a violent thunderstorm reverses the polarity of the residual field magnetism. *Remedy:* Re-establish correct polarity of residual magnetism by connecting the positive terminal of a 45-volt B battery to the *normal* positive terminal of the dynamo; likewise connect the negative terminals. Switch the motor-generator set on and break the battery circuit as soon as the dynamo builds up with correct polarity.

[THE END]

For Uncle Sam—& *YOU*
SAVE EVERY OUNCE OF COPPER

MONTHLY CHAT

(*Continued from Page 3*)

through an obsolete amplifier but he has no authority to buy new amplifiers. What he can do, as a competent craftsman in a field in which his manager or owner quite possibly has no trace of competence, is to call emphatic attention to equipment conditions that need correction as a prerequisite to high quality performance.

And if management will not make the necessary corrections it may not be too bad an idea to think about looking round for another job, for all indications are that the theatre that tries to get by on the "shooting gallery" basis of the past is not likely to get by on that basis much longer.

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IT WAS A BRIGHT EARLY DECEMBER DAY and Lieutenant Hudner was flying a Korean combat mission alongside another plane piloted by Ensign Jesse Brown. A burst of flak

caught the ensign's plane and he went spinning down, aflame. Lieutenant Hudner then deliberately crash landed near his flame-trapped shipmate. He radioed for help, after which he fought to keep the fire away from the fatally injured ensign until a rescue helicopter arrived. Today Lieutenant Hudner says:

"Maybe if America had been strong enough to discourage aggression two years ago, my friend, Jesse Brown, might be alive right now. So might thousands more of our Korea dead.

"For it's only too sadly true—today, in our world, weakness invites attack. And *peace is only for the strong.*

"Our present armed forces *are* strong—and growing stronger. But don't turn back the clock! Do your part toward *keeping* America's guard up by buying more . . . and more . . . and more United States Defense Bonds *now!* Back us up. And *together* we'll build the strong peace that all Americans desire!"

* * *

Remember that when you're buying bonds for defense, you're also building a personal reserve of savings. Remember, too, that if you don't save *regularly*, you generally don't save at all. So sign up today in the Payroll Savings Plan or the Bond-A-Month Plan. Buy United States Defense Bonds now!

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Buy U.S. Defense Bonds now!

Lt.(jg) Thomas Hudner, Jr. U.S.N.

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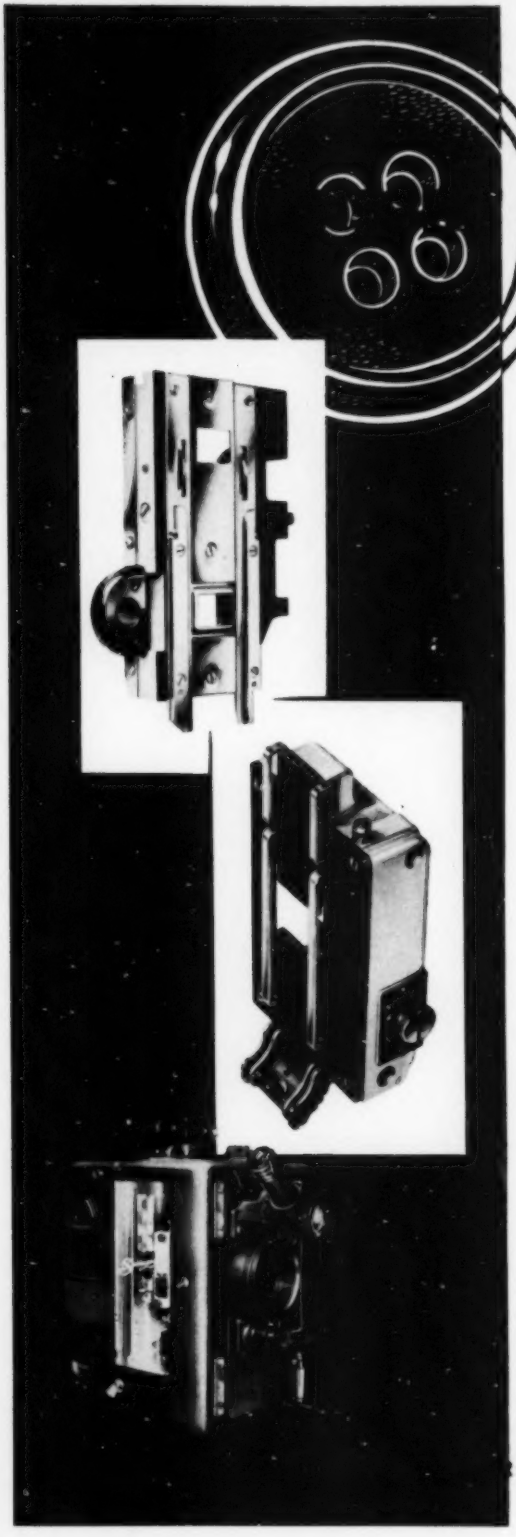

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